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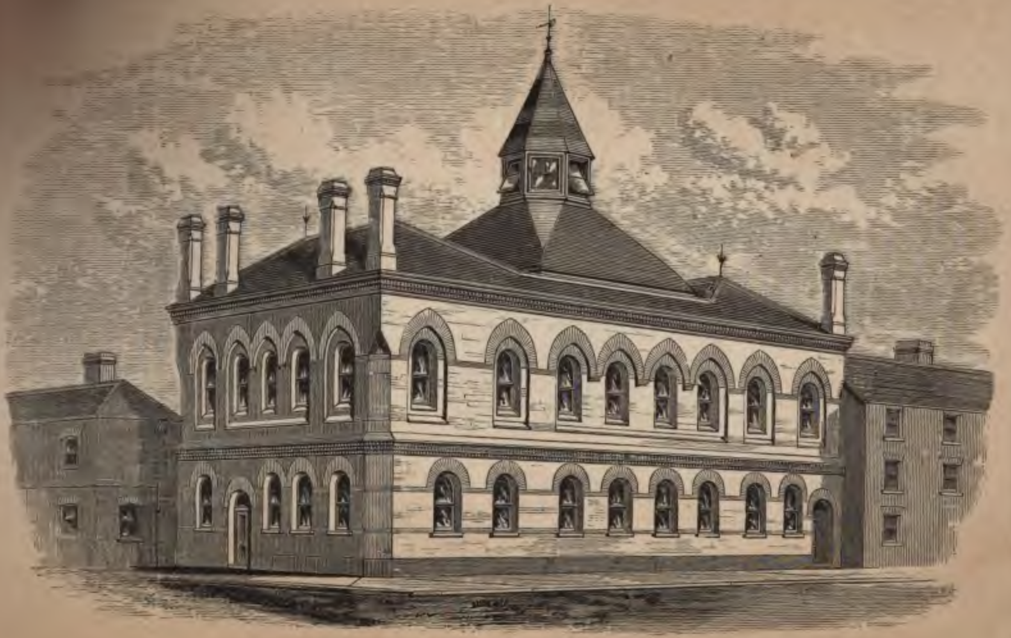

UNIVERSITY GYMNASIUM, OXFORD.

arendon Press Series

A SYSTEM

OF

PHYSICAL EDUCATION

THEORETICAL AND PRACTICAL

BY

ARCHIBALD MACLAREN

LATE OF THE GYMNASIUM, OXFORD

WITH ILLUSTRATIONS
DRAWN ON WOOD FROM LIFE BY ALEXANDER MACDONALD
AND ENGRAVED BY J. D. COOPER

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PART I.

PART I.

GROWTH AND DEVELOPMENT.

THE frame of every individual has its ultimate size, shape, and capacity determined from the commencement of its organization—bears within itself the germ of its perfectibility; but to this it will only attain when the laws and agents which regulate and support its growth and development are faithfully observed and duly administered.

In the sense in which these two processes will be spoken of in the succeeding pages, the former is regarded as a mere increase in height, usually completed about the eighteenth or nineteenth year; and the latter as the bringing to their proper size, perfect conformation, and highest capacity, the several parts which together make up the body as a whole, seldom completed before the twenty-third or twenty-fourth year[a].

The first part of the process of development has already been accomplished at birth, each organ and limb having its destined relative size, shape, position, and function assigned; but the second part, the bringing of each of these to its completion, remains to be accomplished. This ultimate development is however an essentially different operation from the first; the one being the unfolding, as it were, of the several structures from an original germ by laws of which we have at present no definite knowledge, while the latter consists in the adding to and consolidation of these by agents with which we are comparatively familiar, and by laws with which we are daily becoming better acquainted. It is this second or ultimate stage which forms the subject of the present work.

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[a] See Appendices A and B.

Exercise alone of all the agents of growth and development can be regarded in an *educational* light—alone is capable of being permanently systematized and administered as a means of progressive bodily culture. There are rules and regulations to be observed in the administration of the other agents, to suit age and season, and habits and occupations; and on the judicious observance of these much of the bodily health of all, but especially of the very young, the middle-aged, and the old, depends; but it is to Exercise almost exclusively that we must look as the means of actual physical culture during the greater part of the period of growth and development. In a treatise on Physical Education therefore, Exercise claims the most important place—claims it however not more from its own value than because it is so much more liable to be misunderstood, misapplied, or neglected than any of the others. Air, food, and clothing are all, in a measure, familiar to every one; and although with many the *modus operandi* of each may not be understood, still their results are evident and immediate; and where error in their application is committed, it is usually either from some inevitable cause of hindrance, or from wilful infringement of laws of which ignorance cannot be pleaded. Thus the dweller in the crowded city is quite aware that it would be better for him and for his children to breathe the pure air of the country; but his avocations determine for him the place of his dwelling. The insufficiently-fed knows well that it would be better for him and for those for whom he has to provide to have abundance of nourishing food; but his poverty determines for him his diet. On the other hand, the intemperate needs no other reminder than the bodily discomforts he experiences to know that by him one of the agents of health has been abused, and its laws broken: he was conscious of the fault on its committal—the penalty also was foreseen. But this is not the case with Exercise; in its nature and in its influence it is still greatly misunderstood, and although the evils which arise from its abuse or misapplication are really as direct and as serious as those which follow the non-observance or misapprehension of any other agent of health, their origin is often less apparent, and they follow less suddenly on the committal of the fault: the punishment is as sure and as severe, but not always as clearly traceable to the transgression.

Error here in a great majority of cases may arise from actual want of knowledge. It is comprehended at once that all the other agents may and should be modified to meet the wants, and to suit the age, the health, and the habits of individuals, but not so with Exercise. Persons of the most opposite bodily condition and capacity will without question or consideration undertake the same physical exertion, although to one the effort may be slight, to the other exhaustion irretrievable. A vague feeling may be entertained that Exercise is a thing to be taken, but to what extent, at what time, or in what manner, are points upon which few really consider it necessary to possess any adequate information. The regular urgent reminders which follow on the neglect of the other agents are missing here; or when they do occur it is only as they affect some other one of these. For want of Exercise, appetite fails—for want of Exercise, comfortable bodily warmth is not sustained—for want of Exercise, refreshing sleep is not obtained—but these, reminders though they be, come indirectly and, as it were, incidentally only. They speak not with the imperative voice of hunger or thirst, or cold, or oppressive heat, or fatigue, or unpleasantly affected respiration. Unfortunately also there are many persons who have what might almost be called a natural disinclination to bodily exertion, that is, a dis-
nation to physical effort, inherited or induced by
ances attending the comforts, the luxuries, and
tions of civilized life—a disinclination which,

unless combated at the very outset, grows stronger by indulgence; for Exercise is determined by what a man *does*, not by what he possesses or can obtain. It is from these and many other reasons hereafter to be noticed, such as extreme mental employment and the engrossing cares and absorbing anxieties of business, that Exercise in the present day holds its all-important place among the agents of health, and the laws which regulate its administration their all-important office in promoting growth and development.

What then, as I have already asked, and do not now for the first time endeavour to answer[b], is Exercise? What does it do? and, How does it do it?

Exercise may be defined as muscular movement produced by muscular contraction, by which indeed every motion of the living organism is accomplished. This property of contractility with which muscular fibre is endowed, and which, so far as we know, is shared by no other constituent of the body, is to some extent described in the term—being the power of contracting or shortening the space between its two extremities.

The entire muscular system has been primarily divided into *voluntary* and *involuntary* muscles. The first, comprising all those which are subject to the will, form the bulk of the muscular system; they are mainly distributed over the framework of the bones, their office being to move the part or parts to which they are attached. The second comprises those over which the will has little or no control, but which are stimulated to action by some other agency, each muscle or class of muscles having its proper stimulus; these are placed chiefly within the cavities of the body, and are employed in the vital processes of respiration, digestion, circulation, &c. It is with the voluntary muscles that we have now particularly to deal.

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[b] See 'Training.'—Macmillan, 1867.

Exercise I have defined as muscular movement; but it must be movement of force sufficient to engage the energetic contraction of the muscles employed. Here we are touching upon the most important principle in the entire subject under consideration, namely, the destruction and renovation of the tissues of the body which it is the object of Exercise to accomplish.

Our material frame is composed of innumerable atoms, and each separate and individual atom has its birth, life, and death, and then its removal from the 'place of the living.' Thus there is going on a continuous process of decay and death among the individual atoms which make up each tissue. Each atom preserves its vitality for a limited space only, is then separated from the tissue of which it has formed a part, and is resolved into its inorganic elements, to be in due course eliminated from the body by the organs of excretion. These processes are greatly influenced by the activity of the bodily functions. Every operation of the muscles or
es involves the disintegration and death of a certain
their substance. We cannot lift a finger, we
rform the slightest movement, without causing

a change in certain of the atoms which compose the muscles executing the movement, in those of the nerves conveying the stimulus which directed them to contract, and in those composing the nerve centres in which the stimulus originates; and this change involves their decay and death.

The loss then of the body, and of each part of the body, being in relation to its activity, a second process is necessary to replace the loss, otherwise it would rapidly diminish in size and strength, and life itself would shortly cease. This reparative process is performed by the nutritive system, the organs of which convert our food into blood—liquid flesh (*chair coulante*), as it has been called—which in itself contains, and in its never-ending circulation bears to each tissue, the material for the replacement of all waste and for the building up of all additions. And as this material is borne along through channels permeating every part of the organism, each part, by a law incomprehensible but unerring, selects from it and appropriates that particular *pabulum* which is fit for its special use, and that only. At every point of the human body is this law in unceasing operation—activity, a loss of vital power, disintegration, decay and removal—to be met by a replacement of substance and a renewal of vital power. And as the disintegration of any part is hastened by its activity, so by an equally unerring law is the flow of blood, bearing the renewing material, increased in that part; and again by a law equally unerring and ever operative, the worn-out particles are cast into this current in its backward course, and conveyed to organs whose function it is to eliminate them from the body. And during the period of growth, and, within certain limits, until the full attainable physical capacity of the individual has been reached, the new will ever exceed the old, so that a gradual increase in bulk and power will be obtained. And the strength of the body as a whole, and of each part of the body individually, is in relation to the frequency with which these atoms are changed; and the strength of the body as a whole, and of each part of the body individually, is thus ever in relation to its *newness*.

Exercise, then, as we have seen, is the chief agent in the destruction of the tissues; but it is also the chief agent in their renovation, inasmuch as it quickens the circulation of the blood from which the whole body derives its nourishment, the tide on which is brought up all fresh material, and on which is borne away all that is effete and useless—brought up and borne away most rapidly in those parts which are being most rapidly employed, where disintegration is most rapidly taking place.

I am here purposely narrowing my subject, and limiting my observations to the process of circulation only as it affects the nutrition of the muscles; but all the systems of the body, and every process connected with its growth and development, or influencing its
and strength, are also proportionately affected

by the acceleration of the circulation of the blood by exercise.

But besides muscular movement, true Exercise possesses another ingredient, which may be termed *resistance.* The voluntary muscles are made to do more than merely to move the parts to which they are attached. Man is placed on the earth to labour, to toil, to overcome and to remove material obstacles innumerable. Everything which floats upon the ocean or is built upon the land is the work of his hands—in simple fact, has been constructed by the contractions of his voluntary muscles ; these muscles were made therefore not merely to enable him to *move*, but to do this and to carry his burden too. They were made in their action to encounter and overcome *resistance* in every movement; and being created for this, their health and strength will be developed and sustained in proportion to the fidelity with which this their design is remembered and observed. Exercise, which is voluntary labour, must resemble actual labour in all its physical essentials, if it be desired to obtain from it the physical advantages which actual labour bestows; without resistance there can be no full demand for muscular contraction, no full call therefore for material disintegration, no full requirement therefore for material renewal involving proportionate increase of bulk and power; for, as we have seen, the strength of the body, and of each part of the body, is in relation to its youth or newness.

These are the chief essentials of Exercise when viewed in connexion with the voluntary muscles; but it is also an essential of true Exercise that the movements of these muscles shall be of speed or force sufficient to quicken the breathing; in other words, to increase the action of the *in*voluntary muscles engaged in the processes of respiration and circulation. During active exercise the act of breathing becomes greatly accelerated; each inspiration is larger in volume, and each follows each in quicker succession, than when the body is inactive. This is a most important feature of exercise, for with every breath a load of the wasted material of the body is given up by the blood in the form of carbonic acid, &c., and its place supplied by life-giving oxygen from the surrounding atmosphere. To make this all-important process plainer, let us glance at the mechanical action of breathing.

On the requirement for air, the *besoin de respirer*, being experienced, the inspiratory muscles contract and lift the osseous framework of the chest, thus increasing its diameter from side to side and from back to front; while at the same time the large arched muscle (the diaphragm) forming the convex floor of the cavity also contracts, and in doing so its fibres are straightened, and its elevated surface is consequently depressed, increasing the diameter of the chest from above downwards. As this takes place the air rushes down the trachea, or windpipe, and passes at once into the lungs, which it fills out in every direction. But all muscular action is intermittent; the contractile effort accomplished, the reaction begins; the inspiratory muscles relax and a second set of muscles, the expiratory, antagonizing those which lifted the walls of the cavity, now contract, and the muscles of the abdomen, antagonizing the diaphragm, also contract, and the air is expelled by the aperture through which it entered. This is, in outline, the process of ordinary effortless breathing; but in the forced respiration of energetic exercise, and especially of exercise calling into action the muscles of the upper limbs and the upper region of the trunk, many of the voluntary muscles may also be employed in the process of respiration.

I have stated that the involuntary muscles are prompted to action each by its proper stimulus; and the heart is stimulated by the presence and augmentation of blood within its cavities. Thus, the instant that any act of exercise begins, a considerable number of voluntary muscles are put into rapid employment; the contractile action of these muscles impels the blood in their veins onwards towards the heart, venous blood being greatly dependent on muscular action for its circulation; and the heart, stimulated by its presence, energetically contracts, ejecting its contents, and the blood is flushed along the pulmonary artery and distributed throughout its ramifications in the lungs. As the exercise continues, wave on wave comes up from the heart, each driving before it its predecessor,—out of the lungs, along the pulmonary veins, back to the heart, where it is again rapidly admitted and as rapidly ejected[c]: for the heart is a double organ, performing the double office of propelling the blood through two distinct channels of circulation—through the one for its aëration in the lungs, through the other, when so aërated, for the nourishment of the whole body. Out of the heart then it is again ejected, out by the great trunk arteries, and along their innumerable branches, to complete the round of the systemic circulation. But neither heart nor lungs, nor vein nor artery, throughout the double circulation, is a *passive* agent in its progress; for though the heart is the great agent of propulsion, the whole circulatory channels possess a certain amount of contractile power, and are endowed with a degree of elasticity, and may in fact, in this respect, be regarded as hollow muscles actively engaged in regulating the moving current within them; and their health and strength, and functional ability, are promoted by the same agencies, as they are subject to the same laws, as those which influence the condition of the rest of the body.

On these two powers, muscular and respiratory, depends the ability to perform all bodily exercise. The first involves the contractile force of the voluntary muscles employed; the second is more complicated, olving the contractile force of the heart, the con-
of the lungs to perform their function, the size
e of the chamber in which these organs are

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tity of blood ejected from the heart of a healthy adult of
, at each propulsion, is estimated at about two ounces.

contained, and the contractile force of the respiratory muscles, voluntary and involuntary.

Such in brief is Exercise, such the ends which it accomplishes, and such the manner of their accomplishment; namely, the *destruction* of the tissues, the hastening of the decay and death of every part coming within its influence; but also the speedy removal of all waste, and the hastening forward of fresh material for its replacement; and in doing this it attains three distinct but co-relative results.

1. It increases the size and power of the voluntary muscles employed.
2. It increases the functional capacity of the involuntary muscles employed.
3. It promotes the health and strength of the whole body by quickening circulation and increasing respiration.

Our first record of physical training, that is to say, of any system adopted and practised with the single view of improving and cultivating the physical resources, is to be found in the competitive exercises of the early Greeks and Romans; and it has been said that we have lost as much by the discontinuance of the system of bodily exercise of these nations as we have gained by our knowledge of physiological science. This is one of the aphorisms which men are fond of repeating, but which will not stand criticism. No price can be set upon our knowledge of physiological science, no estimate can be formed of its value. The extent, the importance, and the value of the system of bodily exercise practised by the Greeks and Romans we can appraise exactly—can gauge with almost mathematical accuracy, because we know entirely of what it consisted and for what purpose it was organized and maintained. We can therefore tell, by a comparison of the want experienced with the thing produced to meet the want, if the object desired were accomplished; and we can do this chiefly, if not wholly, by the light of physiological science, which alone has revealed to us what Exercise is, and what its suitable administration can accomplish in the human frame.

It is generally admitted that this system of bodily training—unguided, undirected as it was by a ray of science deserving of the name—accomplished the object desired. How did they who framed it, thus groping in the dark, grapple with and hold fast by the truth? By the observation of results. This was the lamp which guided them in the selection of the exercises which formed their system of bodily training. They observed that the strength of the body, or of any part of the body, was in relation to its muscular development, and that this development followed upon, and was in relation to, its activity or employment. They did not know that man's material frame was composed of innumerable atoms, and that each separate and individual atom had its birth, life, and death; and that the strength of the body as a whole, and of each part individually, was in relation to the youth or newness of its atoms. And they did not know that this strength was consequently attained by, and was retained in relation to, the frequency with which these atoms were changed, by shortening their life, by hastening their removal and their replacement by others; and that whenever this was done by natural activity, by suitable employment, there was ever an advance in size and power, until the ultimate attainable point of development was reached. They simply observed that the increased bulk, strength, and energy of the organ or limb was in relation to the amount of its employment, and they gave it employment accordingly.

They must have observed, however, that this did not apply in equal degree to all kinds of muscular employment, and that it applied most directly to those where the action was rapid and sustained. They did not know that this rapidity of muscular contraction and expansion was the chief agent in quickening the circulation of the blood, from which the whole body derived its nourishment; the tide on which was brought up all fresh material for incorporation into its tissues, and on which was borne away all that was effete and waste—brought up and borne away most rapidly in those parts which were being most rapidly employed—for they did not know that the blood was a moving current at all. They only observed that exercises consisting of rapid muscular movement were most conducive to strength and activity; so, without exception, the exercises composing their system were of this description.

But they must have observed also, that there was a form of physical employment which did not give physical development, or yield its natural fruits of health and strength; and that was the slight, effortless occupations of many art-callings and crafts. They did not know that without *resistance* to be overcome there could be no full demand for volition, no full call therefore for material disintegration and renewal, with proportionate increase in bulk and power. They simply observed that development was in relation to the quality as well as to the quantity of exercise—that where energy was exacted in the practice, energy was the fruit of the practice; so for their system they selected exercises where energy was voluntarily called forth in the highest possible degree.

Other essential constituents of exercise owed their recognition to the same source—the observation of results. They observed that during certain kinds of physical exertion the act of breathing became greatly affected, that each inspiration was larger in volume, and that each followed each in quicker succession, than when the body was inactive. This they must have observed, although they may have viewed it but as a drawback to physical ability, a hindrance to be overcome, or in the same light in which our schoolboys now view it—as a condition of 'bad wind' or 'internal fat;' for they could not know that in every breath they breathed, a load of the wasted material of the body was given up by the blood and its place supplied by the life-giving oxygen from the surrounding atmosphere; and that just in proportion to the rapidity and energy of muscular movement during the exercise was the rapidity and volume of the current of the blood rushing through the lungs; and that, therefore, for this current of blood to be aërated, proportionately large and proportionately rapid was the current of the air respired; and that, following the natural law of development being in relation to employment, the lungs themselves were strengthened by this increased activity. They, probably, simply observed that the power to sustain this accelerated process of respiration was obtained in proportion as the exercises which excited it were practised; so exercises which required the sustaining of accelerated breathing received an important position in their system.

They must have observed, further, that energetic physical exertion and quickened respiration caused the skin to be suffused with moisture, and that this gave instant relief from a discomforting sense of heat. They did not know that this augmented heat was in a great measure caused by the accelerated breathing—the fanning of the fire which is ever burning in the living frame; and they did not know that this moisture was water drawn from the blood and poured out over the skin's surface, in order that the discomforting heat might be with it eliminated. They did not know that the skin itself was a covering of marvellously woven network, presenting millions of interstices and apertures, and that each of these apertures was the open débouche or outlet of a duct or tube which, striking deep its convoluted roots among the underlying strata of blood-vessels, separated from the accelerated currents what might prove injurious to the health of the body, and poured it forth through these myriad mouths; but they observed that these skin-exudations proved a powerful aid to the acquisition of permanent health and strength, and notably so to the health, elasticity, purity, and beauty of the skin itself. So, without exception, every exercise in their system is of that kind which readily contributes to this result.

Finally, they must have observed, that just in proportion to the amount of clothing worn during exercise, were the processes of respiration, and the evaporation of this moisture from the skin, retarded. They did not know the structure or functions of either lungs or skin; still they saw that they both acted together, were stimulated to activity by the same means, and by the same means were sustained in functional ability; and that during physical exertion hindrance to both was in proportion to the amount and weight of the garments worn; so they simply, while performing their exercises, reduced their clothing to the minimum, and thence called their system of bodily training 'Gymnastics.'

Thus, then, by the observation of results were the ancients guided with sufficient accuracy in the comprehension of the chief features, and in the estimation of the relative value, of certain modes of bodily exercise;

and thus they were enabled to choose, on assured grounds, those exercises which were most suitable for the system which they desired to organize. They desired a system specially applicable to individual culture, individual exertion, individual excellence, individual distinction; a system which should cultivate personal courage, presence of mind, and decision; a system possessing the utmost limit for individual effort, presenting the fullest opportunities for personal display and personal distinction. Therefore was the hand laid upon all exercises of high competitive effort—wrestling, boxing, throwing the discus, racing on foot, on horseback, and in chariot. The system was as simple, as practical, and as serviceable as the Greek shield or the Roman sword.

The system of bodily training of Greece and Rome had then but one aspect, one aim, one object. It was designed to practise the youths of the country in all exercises tending to qualify them for the exigencies of war, as war was then pursued, as campaigns were then made, as weapons were then borne, as battles were then fought. Other object, other aim, other aspect, had it none.

But in those days, as in our own, there must have been men of unsound constitution and imperfect growth, from original weakness of organization, or from illness, ignorance, neglect, accident, and other causes. What system of bodily training was framed for their behoof? None. Here the observation of results was unequal to the requirement. They could reach no higher—they aimed no higher—than the production of a series of athletic games, suitable to the young, the brave, the active, the strong, the swift, and the nobly born.

Our knowledge of physiological science is something more valuable than this. A system of bodily exercise which should give added strength to the strong, increased dexterity to the active, speed to the already fleet of foot, is not what is alone wanted now. It is not to give the benefit of our thoughts and observations and the fruit of our accumulating information to the already highly favoured, and to them only, that we aim. On the contrary, it is the crowning evidence of the Divine origin of all true knowledge, that in benefiting all within its influence, it benefits most bountifully those whose needs are the greatest.

In our days, as of old, the race is still to the swift and the battle is still to the strong, but the battle of life now is waged with the brain for weapon, and the race is the high pressure competitive efforts of memory and mind. These are the great and all-absorbing struggles of our times, a 'struggle for life' as hard, and involving results and transformations as unerring and inevitable, as ever were traced in the origin of species.

It is health however, rather than strength, that is wanted now—*that* is the great requirement of modern times, with modern men, at non-military occupations. Bodily power, activity, and stamina for the endurance of protracted fatigue, are still at this day as much the real want of the soldier as they were in the days of Xenophon, of Cæsar, of Napoleon. But the purposes and practices of war are not the all in all with us as they were with the Greeks and Romans; nor are the whole of our able-bodied men under arms, nor the whole of our youths preparing for conscriptive battalions, as were the youths of Germany and France in the last century. Our own army, scattered over the whole globe, and encountering the severities of every clime, claims but a fraction of our men; a small portion only of our youths are in uniform: but other occupations, other habits, other demands upon mind and body, advance claims as urgent as ever were pressed upon the soldier in ancient or modern times. From the nursery to the school, from the school to the college or to the world beyond, the brain and nerve strain goes on—continuous, augmenting, intensifying. Scholarships, competitive examinations, speculations, promotions, excitements, stimulations, long hours of work, late hours of rest, jaded frames, weary brains, jarring nerves—all intensified and intensifying—seek in modern times for the antidote to be found alone in physical action. These are the exigencies of the campaign of life for the great bulk of our youths, to be encountered in the schoolroom, in the study, in the court of law, in the hospital, and in the day and night visitations to court and alley and lane; and the hardships encountered in these fields of warfare hit as hard and as suddenly, sap as insidiously, destroy as mercilessly, as the night-march, the scanty ration, the toil, the struggle, or the weapon of a warlike enemy.

Yes, it is *health* rather than *strength* that is the great requirement of modern men at modern occupations; it is not the power to travel great distances, carry great burdens, lift great weights, or overcome great material obstructions; it is simply that condition of body, and that amount of vital capacity, which shall enable each man in his place to pursue his calling, and work on in his working life, with the greatest amount of comfort to himself and usefulness to his fellow-men. How many men, earnest, eager, uncomplaining, are pursuing their avocations with the imminency of a certain breakdown ever before them—or with pain and weariness, languor and depression; when fair health and full power might have been secured, and the labour that is of love, now performed incompletely and in pain, might have been performed with completeness and in comfort.

Let it not from this be inferred that I consider health and strength as in any manner opposed to each other; on the contrary, they are most intimately allied, and are usually by the same means and in the same manner obtained. Very closely are they connected, but they are not the same, and a man may possess either without the other. For strength may be due to the great force
l by one system of the body, such as the mus-
reat force in one part of the body, such as

the trunk or the limbs; but health is the uniform and regular performance of all the functions of the body, arising from the harmonious action of all its parts—a physical condition implying that all are sound, well-fitting, and well-matched. Young minds do not look far enough into life to see this distinction, or to value it if seen; they fix their eyes longingly upon *strength*—upon strength *now*, and care not for the power to work long, to work well, to work successfully hereafter, which is Health. Therefore it is fortunate that the same means which usually give strength give health also; although the latter may be jeopardised by irregular efforts to obtain the former. Again, it is fortunate that this most desirable of all earthly possessions should spring from the regular and uniform development of the body as a whole, not from the extreme development of any special part. Vast strength of limb may be found united to a comparatively feeble trunk, a massive trunk to dwarfish limbs, great muscular force to delicate lungs. These alike reveal local power and local weakness, and these are not the developments which yield Health.

Let both man and boy therefore cultivate strength by every available means, but let it be general not partial strength. The Battle of Life requires for combatant the *whole* man, not a part; and the whole too in as good condition as can be brought into the conflict.

There is no profession, there is no calling or occupation in which men can be engaged, there is no position in life, no state in which a man can be placed, in which a fairly developed frame will not be valuable to him; there are many of these, even the most purely and highly intellectual, in which it is essential to success; essential, simply as a means, material but none the less imperative, to enable the mind to do its work. Year by year, almost day by day, we see men falter and fail in the midst of their labours—men to whom labour is life, and idleness is death—men who with a negation of self and self-comfort even unto martyrdom, devote themselves to great purposes and great works, and before their completion fail; men who run the life-race with feet winged with the purest faith and hearts full of the noblest hope, and who, with the goal in view, falter and fail; and all for want of a little bodily stamina—a little bodily power and bodily capacity for the endurance of fatigue or protracted unrest or anxiety or grief. Strongly has this been ever impressed upon me, more strongly than ever of late years, but never so strongly, never so sadly, never in its every aspect so impressively, as in the death of a late statesman, eminent alike for the height of his intellectual attainments, the nobleness and purity of his aspirations, and the gentleness and almost feminine sweetness of his character. He sank in early manhood, with his great career just begun, his great works but outlined by his nd; to other hands was left their accomplishment, er hearts their fulfilment, and all for want of f that bodily stamina, a little of that material hardihood, a little of that power of enduring fatigue, which he was, even as he failed, seeking to extend, through the means of this system of bodily training, to every soldier in the land.

This need of such a preparation for the coming struggle of manhood in these times of high civilization and intellectual advancement being then so apparent, what is the great hindrance to the due training of the body? It is to be found in the too *exclusive* cultivation and employment of the mind; in the long and continuous hours of physical inaction with extreme mental effort and inordinate mental stimulation, which the requirements and educational demands of the present day often involve; in the overlooking or ignoring of the fact that the body also has urgent and distinct claims to culture and employment.

Are these two then opposed? Is a healthy, energetic, and vigorous frame incompatible with a powerful and vigorous intellect? We know that it is not so. Science and experience alike confirm the fact that the two are not only compatible, but that the one is in every case an aid to the other. That the intellect can rarely attain, or if it already possesses, can rarely long retain a commanding height when the bodily functions are impaired; that the body itself will be at its best and most worthy condition when its claims are most fully shared by mental occupations, and that the healthy condition of the mind, produced by sufficient and natural employment, will react most favourably upon the body, can never be doubted for a moment; yet we continually find the one warring upon the other. We shall find the reason of this in the overlooking of the laws which govern both mind and body.

The mind acts through a material organ, the brain, upon which it is entirely dependent, and which, in common with the other organs of the body, is subject to a constant decay and constant renewal from the same vital fluid; these processes being accelerated and its strength and vigour consequently augmented in proportion to its activity. But in common with other organs also, if this activity is carried on beyond certain limits, its waste exceeds nutrition, its strength gives place to weakness. The mind then is dependent upon the blood for its material support, and its healthy action is dependent on its receiving an adequate supply of healthy blood[c]. Moreover, the organ of the mind being subject to the same laws as the other organs, requires similar alternations of rest and action to maintain it in its natural state of efficiency; and if either of these states be deficient or in excess, the brain, and consequently the mind, will deteriorate. If therefore the cultivation or exercise of the mind be neglected, it will of necessity be weakened in precisely the same manner as the other organs are weakened by insufficient use, will deteriorate both in strength and vigour and the power of enduring fatigue. If, on the other hand, the exercise of the brain be excessive, beyond the point where the nutrition is equal to the waste, it will suffer in the same way and to the same extent as the other organs would do.

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[c] This is manifested in numerous everyday occurrences, and one proof of it, frequently coming under my own notice, may be seen in youths whose upward growth is very rapid and demands all the resources of the system; in which case the mental powers occasionally ome temporarily enfeebled, recovering rapidly as soon as the l demand upon the nutritive powers has ceased. This is the case when nutrition from insufficient or improper equate.

It would be well if parents would ask themselves at the outset what is their object in the training of their children. 'They wish them to be thoroughly educated,' would probably be the response. Then let their first care be that the body shall be healthy and fairly grown. Let them take care that the mind shall receive that amount of culture which will develope and strengthen it, but let them pause at that point where exercise and application are merging into fatigue; so shall it attain its utmost attainable point of strength and vigour, so shall it reach its highest attainable capacity of enduring exertion and effort. Year by year will it be found to increase in these attributes, and in the aftertime, if a call for extra exertion should come, it will not come upon it unprepared. And more than this, the body having received its due share of cultivation also, will itself be gaining year by year, and while contributing to the health of the mind by its own health, will be able to endure successfully its allotted amount of labour, in whatever position of life, under whatever sun, it may toil. Nor let parents imagine that their sons who are destined to what are, chiefly or exclusively, sedentary professions, need not so much preparation for their coming life. The clergyman, the physician, the barrister, are often called upon to endure even as much bodily fatigue as the soldier or the sailor, and the numerous premature failures among all these classes show how needful such preparation is and how little the necessity has been recognized.

And yet how often do we find parents stimulating by every imaginable method, and by every suggestive expedient, the mental cultivation of their children; inciting them to take from the hours that should be given to physical exercise and to physical recreation, and to devote them to study. What is it these parents are seeking? Is it the future welfare of their children, or is it (let us examine it closely) the gratification of their own pride in their children's superior talents and intellectual attainments? It has been said that the pride of parents in their children is, of all kinds of pride, the most excusable; but even our pride in our children may have many phases, and that phase cannot be a purely unselfish one which would risk ultimate health and happiness for temporary distinction, praise, and admiration.

The very interest evinced in the premature development of intellectual ability is dangerous to the young, appealing as it does to one of the most powerful stimulants in the youthful mind, the love of praise and notoriety. Boys soon learn to love the excitement which such an artificial mode of life produces, and cease to feel any interest in, or any desire for, the active pursuits usually so dear to youth. Others there are thus forced into abnormal advancement, who work on reluctantly to the end, but once emancipated, the distasteful task is for ever abandoned. Which of these is most deserving of our pity, the unnatural young hermit, who in his books alone takes delight, or the too natural little Arab to whom books and book-learning have become a thing of disgust? Most parents have at some time or other felt a pang of alarm at seeing their child turn with carelessness from the food which they knew to be necessary to its well-being. I have frequently experienced the same feeling at seeing a child turn with indifference or dislike from the sports and pursuits of his companions to creep back to his books; and also as much alarm, mingled with anger—for false and cruel must have been the teaching which caused the dislike—at seeing the healthy and strong child turn with repugnance from his books[d].

Earnestly however as I desire to advocate the cultivation of the bodily powers, I would guard against its being thought that I would neglect cultivating to their full capacity the mental ones. That would only be erring in another direction, and although a safer one in some important respects, important as regards present comfort and future health, it is still altogether erring; and the right path is broad and open and plain, free alike to all who will look for it with unprejudiced eyes. The brain also requires systematic and ample exercise to develope its attainable powers, and where there exists no unusual weakness, its reasonable culture can scarcely begin too soon or be pursued too steadily. Putting aside the necessity in these days for a highly comprehensive education, a degree of mental culture proportioned with careful hand to the age and mental and physical capacity will be found to act with advantage to the latter, and the relish and zest for bodily exercise, which supplies the most valuable of all incentives, will be increased by it. The giving of a large part of the day to exclusive bodily occupations is, to my mind, for those who are to take a place in the educated world, an equal error—a rejecting of the advantages of civilization. The body makes no such exacting demands. Let it not therefore be inferred that I would undervalue the purely mental work of schools, nor let it be for a moment imagined that I would advocate a less active, a less energetic, a less earnest pursuit of it. On the contrary, it is because I value it at its highest price, and se I would sustain in their most ardent efforts its youthful votaries, and enable them in the aftertime to reap to the full the fruit of their labours, that I plead for a more discriminating indulgence in occupations purely mental and sedentary at this period of life. For there is no error more profound, or productive of more evil, than that which views the bodily and mental powers as antithetical and opposed, and which imagines that the culture of the one must be made at the expense of the other. The truth is precisely the reverse of this. In the acquirement of bodily health mental occupation is a helpful, indeed a necessary, agent. And so impressively has this been proved to me, that in cases where the acquisition of bodily health and strength was the all-in-all desired by the parent, and the one thing longed for by the child (and in some cases almost despaired of by myself), I have been careful to allot and mark out a proportion of mental with bodily occupation.

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[d] 'My boy works seven hours a-day regularly, sometimes eight,' said a lady to me composedly. The boy had just turned his eighth year. Four languages besides his own, Latin and Greek, French and German, with History, Geography, Arithmetic, and Instrumental Music! Were his headaches real or sham, I wonder?

Schools, large and small, are yet to be found where the exclusive bookworm is an object of admiration and wonderment, and masters and parents unite in stimulating his industry and lauding his progress. But every sensible man feels for him but commiseration, and regards him but as a warning; for he looks from the boy to the man, and from the schoolroom to the outer world, with its rude encounter and its stern and prolonged struggle, and he sees how unfit are such a frame and such habits for the task;—a warning too which urges less considerate minds to an opposite extreme! 'My boy shall cultivate his *body*,' says an astonished but not admiring father; and the resolve is a wise one, for well worth cultivating are the varied powers of the human body; and beautiful it is, and wonderful as beautiful, to watch the fair and free development of the frame of a shapely child: but the emphasis on the terminating word was meant to indicate that an exclusive culture should be given to the body, and that its twin sister, its co-ordinate companion, the mind, would be left to shift for herself, disowned, excluded from her rightful share in the educational inheritance.

Now this must be error, error arising from ignorance of our very selves. Mind and body should be viewed as the two well-fitting halves of a perfect whole, designed in true accord mutually to sustain and support each other, and each worthy of our unwearied care and unstinted attention, to be given with a fuller faith and more reverent trust than they have who would argue that He who united in us our twofold nature made them incompatible, inharmonious, opposed. No, no; even blind and blundering man does not yoke two oxen together to pull *against* each other. Mind and body can pull well together in the same team if the burden be fairly adjusted.

'Brute force,' 'brute strength,' are terms we constantly hear used, despisingly, of bodily power when it is designed to contrast it with mental ability; just as we hear the holder of an opposite opinion, and possessor of opposite acquirements, talk sneeringly of the 'mere scholar.' But they who speak thus err equally in their praise and in their blame. They seek to sever what were bound together in the very planning, if one may so speak on such a subject, of a living man; they disunite them, and then complain that the dissevered halves are of unequal value; they take the one and cultivate it exclusively, and neglect the other exclusively, and then make comparisons between them; forgetting that their fitness, each for the other, lay in the fair nurture of both, and in their mutual cultivation. Thus we hear of men who think out great thoughts, and work out great conceptions, and who yet in their material frames have not the stamina of a healthy child; just as we see the opposite—men with frames so strong and so hardy and enduring, that incessant toil can scarcely fatigue, and rest alone seems to tire them, yet of mental calibre so small that the intellect seems scarcely adequate to provide for the safety of the mortal machine confided to its care. But either condition is equally the result of error, and either development is equally a monstrosity, although the former is less repellent than the latter, and less humiliating to our intellectual aspirations.

But to return to the school-boy. It is not alone in a negative form, by exemption from extreme mental efforts, that the growth and development of his body is to be secured. Active bodily exercise, at regular and frequent intervals, must be obtained, and for this special provision must be made with as serious a purpose as for any school duty.

All Exercise may be classed under two distinct heads, Recreative and Educational. The first of these embraces all our school-games, sports and pastimes; a long and varied list, such as no other country can produce, and upon which every Englishman looks with pride and affection, for they mould the characters as well as the frames of our youths; and the man who invented cricket as surely, to my mind, deserves a statue to his memory as he who won Waterloo. The influence of our national games upon the national character is valuable beyond computation: nothing could take their place, nothing could atone for their loss.

But valuable as these exercises are—invaluable as they are—it will be at once seen that not one of them has for *object* the development of the body, or even the giving to it, or to any part of it, health or strength: although all of them, in a greater or less degree, undoubtedly have this effect, it is indirectly and incidentally only—the skill, the art, is the first consideration. And in this, as purely recreative exercise, lies their chief value, the forgetfulness of self, the game being all-in-all.

Out of this great good there arises, I will not say an evil, but a want, a defect. The parts of the body which have to execute the movements of such exercises are those which can do them best, not those which
d employment most. Use gives facility of execution,
lity of execution causes frequency of practice;

because we all like to do that which we can do well: and thus inevitably, because based on the organic law of development being in relation to activity or employment, certain parts of the body will be cultivated and become developed to the exclusion of the others. So certain is this the case, that it is as easy to tell from the general development of any youth what recreative exercise he has practised when at school, as it is to tell from the conformation of the chest whether a man pulls on the bow or the stroke side of his College boat, when he comes to the University. It will be found that the lower limbs and right arm have the lion's share of the employment or exercise in almost every one of our recreative exercises. They largely employ the lower half of the body, and where the upper limbs are employed, or the trunk, it is almost exclusively the right side[e]. These distinctive features in our national recreative exercises have the inevitable tendency to develope the lower half of the body to the neglect of the upper; and this is most distinctly apparent to every eye; the lower limbs are usually large and not infrequently massive, while the upper region is usually small and not infrequently irregularly and imperfectly developed, narrow, flat, and, as it were, compressible: it is, in very many cases, years behind the lower limbs in all that constitutes growth and development. Indeed, I almost daily find in my professional life men in whom this inharmonious development is so great, that the upper limbs and upper region of the trunk, and the lower region and lower limbs, scarcely seem to be the halves of the same individual. And while at any time, amongst the hundreds of men and boys whom I have daily under my care, I might find it difficult to point to one in whom this lower half was really faultily grown, I could with painful facility point to dozens in whom the upper was distorted from its proper conformation[f].

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[e] Thus:—

Football—the lower limbs.
Cricket—the lower limbs do the hardest work of the game, the right arm the remainder.
Rowing—the lower limbs and loin.
Racquets, Tennis, Fives—the lower limbs. Fives is played with both hands, but the left has an inferior part.
Fencing—the lower limbs and right arm.
Walking, Running, and Leaping—the lower limbs.

Recreative exercises then, from their very nature, are inadequate to produce the uniform and harmonious development of the entire frame, because the employment which they give is essentially partial. Where the activity is, there will be the development; and if this principle be overlooked, a portion of the body only will be cultivated and the neglected portion will fall far behind the others in strength, in activity, in dexterity, and in endurance, for the simple reason that it will be less abundantly nourished.

Recreative exercise in sufficient amount is usually in
sufficient to maintain health and strength after
and development are completed, but it does
the many wants of the rapidily-changing and

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[f] See Appendix A.

plastic frames of youths spending a large portion of their time in the constrained positions of study; taking shape almost day by day from day-to-day occupations. Hence the necessity for a system of Educational Exercises. It is the office, as it is entirely within the reach, of systematized exercise to modify the growth and distribute the resources of the body so that each particular part shall have its legitimate share, and so to increase these resources that each part of the growing frame shall have its wants supplied.

The one great reason why systematized exercise is not always appreciated or recognized is, that its special nature and object, its susceptibility of gradation to meet the requirements of individuals, and its effect upon the different structures of the human frame, are imperfectly understood. Its effects upon any part but the muscular system are seldom taken into consideration; its vast influence over the other systems, and especially on the organs employed in the vital processes of respiration, circulation and nutrition, seldom appreciated. The evils arising from this imperfect comprehension of an agent so important to the healthy growth and development of the young are manifold and increasing—increasing in the ratio of man's intellectual advancement; because so long as it is believed that systematized exercise gives but muscular power, gives that and that only, few of those engaged in purely intellectual pursuits would care to cultivate it, even could they do so without effort, and fewer still would give to it that effort which its attainment demands. And that for this simple reason, that great muscular power would be to a man so situated comparatively without value.

But if it can be proved that this muscular power is but one result of systematized exercise, and that not its highest—if it can be shown that properly-regulated exercise can be brought to bear directly upon the other systems of the body, and especially upon the delicate and important structures which encase and contain the vital organs, and on whose fair and full development the health and functional ability of these organs must greatly depend through life, then such exercise takes another rank, becomes as valuable to the man who works with his brain as to him who works with his hands, and will be sought for with a desire proportionate to his intelligence, because it will enable him to prolong and sustain his labours with safety to himself and increased value to his fellow-men. But this culture should be obtained in youth, during the period of the body's growth, when every organ and every limb and every tissue and every bone are advancing to occupy their ultimate place and position—while all is plastic and moving, changing and capable of being changed. This is the time for all culture, mental and physical, and most emphatically so for the latter.

Get the strong limbs and shapely frame, and a little, ry little, will keep them so; get the strong heart ple lungs set in the fair-proportioned and elastic d a little, a very little, will keep them so—not more than the busiest life can spare, not more than the gravest mind would seek for mental recreation and beguilement—a daily walk or ride, an occasional break into the country with gun or fishing-rod or alpenstock. But if these are no more than sufficient for the healthy and the strong, what hope, what chance remains for those who have been allowed to grow up feeble and imperfectly developed? How can *they* expect to encounter the wear and tear, the 'jar and fret' inevitable in the path of every working man?

There are many forms of mal-growth, more or less grave, to be seen in every school, all demanding rectification, all susceptible of being rectified during this period of life by systematized exercise. I would instance particularly *Pigeon-breast*[g], or undue prominence of the breast-bone, accompanied usually by flatness of the ribs of the upper region of the chest. I have been able to trace this mal-formation of chest to several causes, such as tight clothing during infancy and childhood, and in many instances to the straining coughs which attend what are familiarly called children's complaints, i. e. Hooping Cough, Measles, Dentition, &c. *Hollow-breast*[g], which is the obverse conformation of *Pigeon-breast*[g] in front, accompanied usually by the same flattening of the ribs. This is usually produced by causes similar to the preceding. *Drooping shoulders*[g], sufficiently expressed in its name, and produced by shoulder-straps or any arrangement of bands or bandages which confined the action of the shoulder-joint in childhood. *Stooping*, which at the same time implies such a manner of carrying the head and neck and upper portion of the trunk, as that they are not in a line with the rest of the column of the body—the chief evil consequence attending the position being the depression of the upper part of the thorax in front. With these may be named some of the forms of Spinal Curvature[h], often proximately due to weakness of the dorsal muscles or to inordinate and unregulated growth. Rapid growth itself, if unattended by relative development, is not only in itself an evil, but is the source of many others. It is no uncommon thing to find a lad at school growing at the rate of six or eight inches in the year. Now it may be stated that the smaller of these numbers is incompatible with fair development and health; the whole resources of the body are drawn in one direction, furthering one process, the upward growth[h]. Nay, when this process is extreme it will be seen to be most intensified up the centre of the body, an idea that might seem fanciful were it not almost daily presented to me as a fact[h].

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[g] See Appendix A.

Another feature of rapid upward growth is that the chest scarcely expands at all during the process. It will be seen to run up from the waist without any expansion whatever[h], while the shoulders fold round to the front, d the head stoops forward from the base of the n of the neck; and seldom does a straight spine accompany such abnormal growth. I have known the chest actually diminish in girth—grow narrower and narrower—as if it were tightened up by the extreme elongation of the general frame. Now the reason for these displacements is, that all these parts are held in their respective places by certain muscles arranged for this purpose; and as the muscles can only maintain their contractile power by frequent and varied exercise, they cannot do this duty if they are denied that which is necessary to their functional ability. This law, which does not apply to these parts alone, but to every part of the body, is markedly seen in the muscles of the trunk. Were these duly exercised, stooping would be impossible, that is, continuous stooping, which involves the origin of many evils of development. Because, if the muscles of this region possessed their proper degree of power, they would of course perform adequately their functions—and one of these is to keep the body upright. It is as useless therefore to tell a boy thus imperfectly developed 'not to stoop' as to forbid him to cough when he has a cold, or to limp when he is lame.

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[h] See Appendix A.

Another abnormal form of growth, but much less frequent, is the opposite to the foregoing—is where the frame seems stunted from its natural height. This dwarfed and arrested growth will be found to have arisen in the majority of cases from some cause which interfered with the proper nutrition of the general system, and it in consequence may be inferred that any means which will restore this condition will restore the naturally attainable capacity for growth and development in the frame, so far as this may yet be extended over the natural period of growth still remaining[1].

Growing to one side, as it is called, is another form of mal-growth frequently to be seen, consisting of a disproportionate development, if not of actual elongation of one side of the body. I have not been able to trace this conformation to unusual employment of the side where the development preponderates, as would be expected; where I find this conformation it is usually with boys who take little or no exercise. No form of mal-growth however is more susceptible of rectification by skilfully-administered exercise. Like all departures from normal growth, this evil extends beyond itself and is productive of other evils. Lateral spinal curvature is one of its frequent results.

There are many other forms of mal-growth and partial development, all open to the curative influence of systematized exercise, to be seen with painful frequency in every school, less striking it may be, but all of importance, and all claiming the serious attention of those who are entrusted with the care and education of the young. In partial development alone—where no trace of mal-growth and no indication of mal-formation exists—an argument more powerful than any which I have advanced, or can yet advance, exists for the adoption of a clearly-defined system of bodily training at our large Schools. I find that almost every youth at the time of passing from these to the University has, as it were, a considerable amount of attainable power and material capacity undeveloped; his body, or rather a portion of it, is in arrears in this respect[j], and as arrears and as a recoverable debt the youth may fairly view it[k]. A large instalment of it he may obtain almost immediately. I find that during the first Term (two months), with properly-administered systematized exercise, the chest will expand, under all ordinary circumstances, two inches, and under peculiar circumstances I have known it reach double that amount. The general rule also is that where the chest has been neglected and is consequently in arrears in development, the arms and shoulders will have shared the neglect and so of course show a proportionate want of development. And these, as they share in all the work of the chest—are in fact the medium through which the chest receives almost all its exercise—share in the gain proportionately. Now had these parts received an adequate share of employment up to this time this sudden development would be impossible; and it must have been arrears of expansion, otherwise the rate of increase

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[1] A remarkable instance of this came under my observation a few years ago. A youth whose growth had for some time been stationary at the height of 5 ft. 2⅝ in., suddenly from the practice of systematized exercise began to grow at a fair and regular rate, and at the age of 21, when he went to India, his height was 5 ft. 6¼ in. Another instance is that of a school-boy whose growth had been all but arrested from a severe fall in childhood. Almost instantly stematized exercise started his latent powers of growth, and in nonths he had grown 8⅞ in.

[j] See Appendix C.

[k] See Appendix D.

would be sustained after the first Term, which is not the case.

But it is not only, or even chiefly, for the faultily-grown, the imperfectly-developed, and the weak—although to these it is a necessity, a necessity if they are ever to be strong—that I plead for the regular adoption of a system of educational bodily exercise in our Schools. What should we think of that schoolmaster, who, because a boy was apt and capable, and for his years well-instructed, would therefore and thenceforward leave him to his own resources and inclinations? Yet in truth similar are the reasons we constantly hear adduced when physical culture is mentioned. We hear men say, 'All exercise should be free, should be voluntary, should be left entirely to a boy's own choice, inclinations, and disposition.' Do we leave him the same licence with the other agents of health? his diet, for instance, or his hours of rest or of study? Yet none of these are more important to his welfare and wellbeing, present and future, than exercise[1]. Whatever may be the developed capacity of the untrained body, it is as far from the symmetry and strength to which it may attain with proper culture, as is the clever but self-taught man from what he would have been with thorough educational training. Certain points in his character stand out large and prominent, powerful in a given line of action, but others are dwarfed and stunted, and show the more meanly from the prominence of others. So it is with physical development and with physical culture: the assiduous and exclusive application to a favourite exercise will strengthen and develope the parts engaged in its practice, but this presupposes the neglect of the remainder, and the result in both cases, the mental and the physical, will be the same—inharmoniousness, incompleteness.

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[1] In fact there are many boys, more than one inexperienced in such points would easily believe, who if left to their own inclinations take no exercise at all, or take it so listlessly that the results are *nil*. Yet these are the very boys that need exercise the most of all, and their reluctance to enter upon it, and feebleness and awkwardness in pur- it, are the strongest proof of their great need of it, the strongest hat as boys they are not living boys' lives—and the boy's life the man's.

It might be a task not unworthy the attention of medical men to enquire if this partial and inharmonious condition of bodily development is not the cause of many forms of debility and also of some of the active ailments of life—the origin of the phrase, so pregnant with meaning, though happily not of literal accuracy, that 'every man has his weak part.' Indeed, I should be disposed to consider the man whose frame is generally and uniformly weak, safer than he whose frame is partially and locally strong, because the natural tendency is to gauge and estimate the general strength by the power of the strongest part. And just as the strength of a rope or chain is but equal to its weakest part, and just as the dependence will be on the general strength of the rope or chain, and its weak point be unnoted until its failure, so will the voice of the weak part of the human body be silenced by the general claims of the rest until the time of exposure and trial.

That special provision has not been made at our Public Schools for the full physical training of youths has arisen from no carelessness or neglect on the part of the earnest-minded men conducting them, but simply because it has not hitherto been recognized as a want—as a thing to be taught or directed or supervised. The very phrase *recreative* explains the whole extent of the want as at present comprehended, and the provision made to meet the want; but to the extent of this recognition it has been met at the Public Schools at any rate with a completeness which leaves little to be desired, and schoolmasters generally know from the best of all sources, practical experience, that unless boys have ample play-time and play-space the tone and energy of mind and body sink, and the school-work suffers; and therefore an ample playground and a fair allowance of play hours, for such as will avail themselves of them, are held as important as a commodious school-room or a well-supplied table.

England may well be proud of her Public Schools, for no other country has anything comparable with them, indeed has neither the schools nor the scholars, nor the families nor the firesides from which the scholars are drawn. For we must go far back—far as the ne-habits and home-teaching of ancestors in for- n generations—if we would get at the origin of ter. Out of England we never find boys, only little men, embryo soldiers, lawyers, and doctors, with the specialities of their avocations sprouting upon them; and their schools have nothing in common with ours, present no point of resemblance. The Public Schools of England are to it what the heart is to the human body—the centre and source of its vitality and power, the spot through which its life-blood flows, from which is distributed to every spot, near or far, the young, fresh, bright stream to strengthen, to revivify, and to renew.

I have dwelt thus long upon what I conceive to be the necessity of providing a regular system of physical education in connection with the purely mental culture of schools, because it is at this period of life, and it is under a school regime that it is most needed, and would most powerfully influence health and strength, present and future. And I have spoken thus strongly of what I conceive to be the error and the danger of exclusive or undue culture either of mind or body, because it is at this period of life, and it is under such circumstances, that the deepest and most lasting impressions are received and the most enduring tastes and habits acquired; habits and tastes that will almost inevitably be carried into succeeding stages of life, and be intensified at every stage. In the University this is markedly the case; here the youth who at school devoted his time and his thoughts exclusively to study, leads an existence still more artificial, now become to him almost a natural one, for the law of adaptability smooths down many things that are irksome when first essayed. Being now free, or more correctly speaking, having now none to over-rule and few to advise, he follows his own inclinations, and this the more keenly that these are the same which have already guided him to distinction. He came up with a school reputation for ability, and this must be preserved, must be confirmed and extended, for school-honours are not the fee, only the earnest-money of the bargain yet to be fulfilled; its eclat is only the god-speed encouragement at a hopeful starting, not the congratulatory cheer at triumph gained. And no one knows this better than the youth himself, and better than himself no one knows that not by talents alone, not by genius alone, was he enabled to plant his foot on the vantage-ground which he occupies, not by these, but by labour; and knowing this he believes that what he thought necessary before to win, is no less necessary now to keep; so the old rule of exclusive brain-work is re-begun. All the early day he reads; only in the afternoon does he go outside the College walls, and then only for a hurried, feverish walk—a very nightmare counterfeit of true exercise to the wants of a frame like his. His lamp is lit at the setting of the sun and scarcely extinguished at its rising. Does he never think when the wick is burned down and the oil is consumed, when one is renewed and the other is replenished, does er think, I wonder, as he sits with the wet round his forehead and sips his green tea, stimulating and urging the weary brain to greater effort, that the lamp of life within *him* needs trimming and renewing? .

What is the other extreme? for we read in the evidence laid before the Public School Commissioners that boys who expect to excel at cricket must spend seven hours a day in the cricket-field. 'My boy shall cultivate his *body*.' Parents may have their wishes in this direction carried further than they anticipated. 'My son spends his days on the river,' writes one to me, a clergyman with his quiver well filled, 'his success in life depends on his success at Oxford, and I tremble as the time approaches for him to go into the Schools.'

These are two extremes, but they divide not the University between them. The devoted bookworm and the devoted athlete are equally removed from another class—a fast diminishing one let it be thankfully recorded—a class which cultivates neither mind *nor* body, with whom the day is frittered away and the night dissipated, with whom time passes without purpose, or profit, or pleasure;—at least such purpose as a man should deign to pursue, and such pleasures as he should condescend to accept. Nothing now, leading to nothing hereafter; the mental advantage nothing, the physical advantage something less than nothing. 'Why cumbereth he the ground?' Year by year, term by term, this class is diminishing. Year by year, term by term, its antithesis is increasing, the true class, the true men, the men well worth devoting life to form, the class well worth devoting life to increase. For as the bookworm had his antithesis in the enthusiast athlete, so has the idler his in another type, in the man who feels that he *is* a man, a man with a body as well as a brain, muscles as well as nerves, and who has no intention of sacrificing either to the other, or either for the other, even if such immolation could be to its advantage. But he knows to the contrary, he feels to the contrary. He feels and knows that by friendly rivalry and interchange of labour and of rest both are benefited; that each may be fully cultivated without infringement of the privileges of its companion, but rather to their mutual gain and well-being. Therefore he has no intention to hazard brain-fever or break-down of any kind from reckless mental effort, just as he has no intention to subject himself to the ignominy of a possible failure in the Schools. He has no faith in delaying until the last minute and then as the phrase goes 'reading his head off.' He has still less in 'passing by dint of good luck.' And he has least of all in trusting to 'natural sharpness' which on mythical occasions is reputed to have 'floored the Examiners.' He knows that there is a given amount of work to be done in a given time, and he knows he can do it if he begins at once, and with regulated effort works adily on to the end. And this he means to do, is he does.

ect for illustration the Universities thus specially, as they are perhaps more distinctly an extension of school-life than the early stages of any of the professions or callings which imply intellectual labour for actual employment; and because it is there I have been able to test by practical observation, over a very long period, the opinions I now venture to advance. A complete change in a boy's habits we occasionally see, an utter reversal of all antecedent tastes we sometimes hear of, but, in the great majority of cases, school-habits and school-tastes become consolidated and confirmed into traits distinguishing more advanced life. In more senses than one 'the boy is father to the man.'

In the second stage, the one immediately succeeding school-life, while the upward growth, although nearly at its close, is still going on, an amount of benefit, second only to that obtainable in boyhood, may be obtained from the regular practice of systematized exercise. It matters not whether the youth be reading for a University degree, or has passed at once to his future profession, his frame is still growing, still changing, still pliant, still impressionable, still liable to be checked in its natural development, and stunted or turned aside from its true proportions, by inactive, sedentary, or exclusively mental pursuits, and still capable of having growth and development powerfully stimulated, and still susceptible of being rapidly advanced healthward by systematized exercise.

As life advances, and as the frame becomes mature with all its structures complete and consolidated, susceptibility of material change diminishes, and actual gain in bodily power is comparatively uncertain and slow[m]. But there is no period of active life in which a man may not profit by systematized exercise if judiciously pursued; only let him use the same discretion in this as he would in practising any exercise of any other kind, abiding by the simple movements of the earlier courses, and leaving to lither limbs and more elastic frames those where the demand for effort is sudden or great[n]. And let him not be disappointed if his progress is slow, or discouraged if he sees younger men passing him on the road; he must remember that he starts late and it is with him at best the alternative of 'better late than never;' but late is late and implies disadvantage; he is trying to do, as well as he can, what could only have been done perfectly in its proper season,

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[m] It is however a noteworthy fact, and one showing with rather startling emphasis the truth of the adage, that 'every rule has its exception,' that of the first five hundred names on the book of the Oxford Gymnasium the greatest increase in development is made by a man in his thirty-sixth year.

	Age.	Height.	Weight.	Chest.	Fore arm.	Upper arm.
	Yrs.	ft. in.	st. lbs.	in.	in.	in.
Oct. 22nd, 1862.	35	5 $8\frac{5}{8}$	9 0	32	9	$10\frac{3}{4}$
Dec. 21st, 1862.	„	5 $8\frac{3}{4}$	9 13	$36\frac{1}{2}$	$10\frac{7}{8}$	$11\frac{7}{8}$

[n] The first course of the system may be freely and almost unconditionally recommended to men throughout what may be called middle fe; care being taken to use a bell and bar well within the physical ity. The best time for this practice is in the early morning, iately after the bath, and when regularly taken it need not ver more than a few minutes.

and that has passed away. The educational time of mind and body is the same, the *growing time;* but just as we see men whose opportunities of mental culture in early life have been small or neglected, in a measure retrieve the loss by later efforts, so may the neglected culture of the body also be retrieved by after endeavours, if judiciously and perseveringly made.

A most important principle in Exercise, and one which should ever be borne in mind, is, that it should be regulated by individual fitness, for the exercise that scarcely amounts to exertion in one person will be injurious and dangerous to another[o]. And not only is this inequality observable among different individuals, but, as we have already seen, the same individual may have parts of his body possessing special power or presenting special weakness. A man may have limbs capable of transporting him at the rate of four miles an hour throughout the day, and for many days in succession, but with heart or lungs all unequal to the effort. Or he may have an organization so frail, and a temperament so susceptible to stimulation or excitement, that the one is an abiding danger to the other.

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[o] A painful instance of this nature was brought before me some time ago. A man boasted to me that he and his son—the father a strong hardy man, the son a lanky and loose grown lad of thirteen years—had just walked from London to Oxford in one day—a distance of nearly sixty miles. Before the year was out they made another journey together—a short one this time—the son carried before, the father, broken-hearted, following. The boy had never recovered from the exhaustion of that day.

It is every man's duty therefore (nor is it a very hard one) to endeavour to ascertain the nature and extent of his physical resources for his guidance at all times, but especially when contemplating any special and exceptional exertion. And it is from the non-observance of this principle that we hear so frequently of accidents and cases of serious indisposition after unwonted physical effort. If any one whose habits of life have been of a comparatively sedentary nature, suddenly, and without any preliminary preparation, resolves to change these habits for active ones, he will unquestionably derive harm from such an attempt, simply because, in doing so, he is infringing those principles which alone can make it useful. Thus, if he attempts an exercise which is suited to one whose frame, from regular and continuous practice, is capable of performing it without fatigue; if he makes a demand upon his heart and lungs that is beyond their power to sustain, because he sees another man make the same requisition upon *his* well-trained organs of respiration and circulation; or if he selects a certain time of the day for exercise because it best suits his business arrangements, although his brain may be weary, his mental energies exhausted, and his bodily energies depressed, how can aught but disappointment be the result? The stomach when enfeebled by fasting cannot all at once digest a copious meal; the lungs weakened by illness and in-door confinement cannot breathe all at once the external air; the mind depressed by grief cannot all at once be trusted with the full tale of glad tidings. Yet a man does not hesitate to change the habits of every organ of his body as hastily as he would change an ordinary garment, and then to express surprise and disappointment if benefit be not the result of the change.

The infringement of this principle, that 'Exercise should be regulated by individual fitness, that it should be approached gradually and increased only with increasing strength,' has been the cause of much perplexity and suffering. Scarcely a summer passes without our attention being drawn to some victim of its transgression—some one who has escaped suddenly from his desk or study, and, without preparation, or gradation, or precaution of any kind or degree, has betaken himself to mountain-climbing, shooting, boating, or some other exciting pursuit, to break down in the effort, or to struggle through it and *sink* down for many a month and day after it, his powers overtasked, his energies exhausted. Now for the brain-tired, city-worn, business-weary man, these are the pursuits which he would do best to follow, and these are the scenes among which he would do most wisely to mingle, did he do so in accordance with the dictates of reason, and in obedience to the laws by which health and strength are maintained.

This is however the abuse, not the use of a valuable custom which is yearly extending, and extending too among the very men who need it most and to whom it will yield the most immediate and lasting benefit;

a custom which if adopted judiciously will give a healthful fillip to the flagging energies of both mind and body. We call it 'change of air,' and the term is just as good as any other, but it very imperfectly expresses the extent of the change, for it is change of everything—everything we see or hear, taste, touch, or look at, person, place, or thing—change of everything we undertake, undergo, and (probably) understand.

But even when these holiday-breaks are made most sensibly they must not be regarded as the all-in-all of the exercise to be taken. A man cannot in a week or two eat sufficient food to supply the demands of appetite for a whole year, neither can he take sufficient exercise to keep his body in health throughout the four seasons in a summer's ramble. These mountain excursions or sea-side sojourns must be *in addition* to, and involving no curtailment of, the daily walk to or from business, the daily ride to or from somewhere, or the daily employment with or at something; a something which will in its doing quicken the pulse and augment the breathing, and, if possible, bring the perspiration to the forehead.

Exercise may be favourably connected with other agents of health, such as bathing, in the practice of swimming; and with fresh air in country ride or ramble. To men living in large cities—the men of course whose need of exercise is the greatest—it seems but a tantalization to recommend a country ramble; but re are a great many men pining for want of proper exercise who do not live in large cities, and there are a great many others who spend but a portion of their time there, with whom an occasional break along the green lanes in the saddle, or across the meadows on foot, would be a matter of easy accomplishment. Men do not know what they possess in these cross-country bye-ways, and in the power of traversing them on foot—the pleasure, the profit of walking—the first exercise enjoyed in life, the last that is freely taken. But a walk to be a real enjoyable exercise must be a country walk, a country ramble in fact—the antithesis to the 'constitutional' of a measured mile of way on the dusty road—going where fancy prompts and inclination leads, forgetting alike past mental labour and present physical effort in the successively recurring objects of interest that will rise at every turn of the path. The country walk is an exercise entirely our own—purely English—originating doubtless in many favourably concurring circumstances, mental and material; such as love of country-life and country-scenes, of natural objects in their natural places and in their natural aspects, and also from that blending of the thoughtful with the practical elements of character which is peculiar to our own race; and doubtless also to the facilities presented for indulging in bye-path pedestrian peregrinations. I have wandered on foot through many a land but have never seen these dear old stile-paths in any but our own, nor have I ever met abroad the man who cared for them, or could comprehend any pleasure in this source and this scene of exercise. The country walk is good for both mind and body, clearing the brain, and quickening the pulse by the same means. If a man wanted an aid to thought, a help to enable him to look all round a point difficult of access, and at the same time find the antidote to close mental application, I would say, 'Vault the first stile in the first meadow and let your mind track out the windings of the way of your subject of thought, even as your undirected feet might track out the windings of the unsurveyed path on the greensward—through meadow and field, through coppice or common, by river-side or plantation-row—the villager's right of way, secured to him by right of immemorial usage.' For the young and for the middle-aged, for the one as a change from his more energetic and concentrated physical exertions, for the other as a means of bodily exercise and mental beguilement, I know no better recreation.

I have spoken of the irregular and indiscreet yieldings to the natural instinct for physical exertion which is to be found in almost every nature—subdued, it may be, but not dead—and waking up and asserting their claims on every favourable occasion; but the evils which come from these are not so great or so startling in their results, nor do they seem so blameable a transgression, as when these instinctive cravings are blindly and persistently ignored. How [illegible] v, how marked and how painful, are the proofs [illegible] daily recurring. How many gifted men have broken down and are daily breaking down with their life's work only half done, when they might, humanly speaking, have completed it with ease and success, had they not carried it on in utter disregard of the fact that to ensure health of mind they must possess health of body, and at the same time set at naught the laws which the Creator of each has made the conditions of its healthful existence.

I do not need here to quote from the long list of men of every rank and profession whose useful and valuable careers have been brought to an untimely close by death, or more often, and perhaps more sadly still, by the permanent ill-health which baffles all medical skill and science. Numerous are the instances which have fallen under my own notice of individuals who have thus fallen victims to their own shortsightedness. One of them, long famous in the scientific world, absolutely refused to give his mind the intervals of repose which were seen to be essential by all who were capable of judging. 'The night cometh when no man can work' was his answer when urged to give his physical condition some attention; and the night did indeed come: but his working day might, and would in all human probability, have been very considerably prolonged had he been less blind to the laws of his existence; for the last years of his life were passed in the mental night of second childhood.

All this, however, it will be seen, only points the more emphatically to the necessity of a regular system of physical training at the proper time, that time being the period of the body's growth and development. And here I would call attention to the manner in which this principle has been comprehended and observed in the Army, where the efforts of the authorities have been mainly directed to the introduction of the system at the depôts, where the raw country lads come in from the recruiting districts. It is not more directly valuable to the soldier at the outset of his career, than to those who are preparing for no less arduous although very different duties in the campaign of intellectual life.

And there is yet a third direction in which it should be carried; there is yet a third class to whom it would be a boon of the greatest value; to men in offices, and warehouses, and shops; men whose school-life terminated in boyhood, and with whose school-life were relinquished or lost the habits and the opportunities which are essential to full bodily vigour, and who in their business avocations obtain little or no physical employment of a health-giving or invigorating kind; men who spend the whole day, and, it may be said, every day throughout the year in the same round of occupations, and to whom not even the once-a-year holiday of a week or two in summer is allowed. To men thus employed systematized exercise conducted on rational system would be of incalculable value.

ymnasia organized for the use of this class of rs, however, would have special difficulties to encounter, for here would be absent the control which would be available in school gymnasia, and the habitual discipline observed in military ones. For it must not be forgotten that there is always to be found, in every group of men or boys, some who are more eager for momentary distinction than for permanent improvement; always some whose efforts, if not judiciously controlled, would be determined by susceptibility to excitement rather than by bodily power; and where the attendance would be entirely voluntary, the management of such learners becomes doubly difficult. Indeed there is but one means of obviating such difficulty, and that is by a system where the exercises are carefully graduated and strictly progressive; where every man, weak or strong, would work within the actual circuit of his own capacity. Another difficulty with, or rather drawback to these Gymnasia is, that the time available for recreation with men engaged in business is almost limited to the evening, the time least desirable for exercise, for then the bodily energies have become depressed, and the mental faculties subdued—the time and the condition when the mind is least able to stimulate the physical effort, and when physical effort reacts least favourably on the mind. But this is a difficulty that in a measure is already passing; social changes are from year to year taking place which are rendering the continuous hours of labour in many occupations less severe and less prolonged. Employers, it is found, have not been ruined, as was sagely anticipated, by the early closing of offices and shops, and the Saturday half-holiday has neither undermined the morals nor ruined the constitutions of those to whom it has been extended.

And here again the educational aspect of systematized exercise assumes its true importance; an importance resting not only on the stronger frames and greater energies with which it would endow every man —a priceless capital to carry into his avocations—but also on the bias, the taste, and the inclination which it would give in adult life, prompting to the employment of leisure in healthful and manly recreation.

At the very outset, however, I perceived that there were two distinct directions in which a rational system of bodily training might be carried with special advantage. In the Army, because bodily power, hardihood, and activity are the very essence of the soldier's life; and in our Schools, because, as I have already tried to show, *that* is the time and *there* the regime which present the greatest facilities for bodily culture.

It needs but a glance to see that the men who fill the ranks of our Army are drawn from almost every species of trade, occupation, and calling, and embrace almost every grade of physical power; massive, powerful men from the farm, the quarry, the forge, the ware-
use, and the wharf; and slight, half-formed, half-
youths from the factory, the shop-counter, the
nd from the innumerable petty trades in which
employment in closely populated districts.

I believe it may be roundly stated that every occupation followed in this country is represented in the Army; and, if what I have stated regarding Exercise and its results be correct, to state that every form of occupation in this country is represented in the Army is virtually to state that every form of growth and development is represented there also. (I mean of course within those limitations observed in the enlistment of recruits and subsequent medical examination.) Now most of the occupations in which artisans and labourers are engaged give active and powerful employment to certain parts of the body, the other parts receiving comparatively little; and the inevitable result of this unequal employment is unequal development, because power is in relation to activity. The parts that have been actively employed will be shapely and strong; the inactive, neglected parts will be weak and stunted. And this will be evident to every eye that knows what proportions to look for; the nature of the employment leaves its mark upon the man for good or for evil—a sign, a seal, in witness of his strength and beauty, or a brand denoting his weakness and deformity—fashions him, moulds him, for shapeliness or distortion, so unerringly, that to the experienced eye the nature of the craft or calling is instantly revealed; or, the occupation being known, you may tell before looking at the man the condition and the direction of his development. In men drawn from so wide a field will be found every gradation of physical strength, the strongest and the weakest. To take the two extremes for illustration, and to begin with the man of large stature and powerful frame ; how has he acquired this powerful frame ? Chiefly by energetic and powerful exercise. Other things may have contributed, indeed must have contributed, such as abundant diet, and, probably, fresh air; but neither of these, nor both of these, nor all the other agents of health put together, will give muscular power without muscular employment. Now remove such a man suddenly from his occupation, take him to the depôt to be straightened and taught to march with his head upright, his arms close in by his sides, and the trunk of his body held erect and motionless as a pillar, and what are you doing ? That which is suitable and necessary to enable the man to take his place in the ranks as a soldier, but nothing whatever to sustain, far less augment, his bodily energies. The constrained position, the restricted and closely localized movements of parade and drill, all deny to the trunk of the body and the upper limbs any exercise whatever, any share whatever of that which has given them the strength which they possess, for a continuation of which they are pining, without which they must dwindle, to the loss of their shape, and size, and power, and the still more important loss to other parts of the body depending for their health activity upon the health and activity of these. here is another condition of large stature and wth which I would desire to instance ; I mean the man of large frame with little strength, the results usually of a strong and unsubduable germ of growth in the individual, which, with adequate diet and suitable and abundant exercise, produces those splendid specimens of men whom we are fain to view as the type of our race, but who, with an inadequate or irregular supply of these agents during the period of their upward growth, attain the bulk of frame, but miss the soundness of constitution and the physical energies which should accompany it. There are many of these men in the Army—there must ever be many of these men in the Army. We have only to think for a moment of the insufficiency of diet alone, insufficiency in quantity and quality, at a time when abundance was a necessity to either present or prospective health or strength, to know that we have got the *shell* of the man only. Sound, strong, or lasting he cannot be, because in him we have distributed over a large surface that which is only adequate for a small one. Is it possible yet to restore him to the place he was designed to occupy, designed by the incontrovertible evidence of his stature attained in spite of his deprivations? Is it possible to give him that soundness of constitution, energy of muscle, elasticity of action, and symmetry of form which were his by birthright? Not possible—not possible to give after growth is completed that which should have been regulated by growth itself, beginning with its beginning, adding to, proportioning, consolidating, and sustaining every cell of every fibre or tissue, as it was added to the frame; but still possible, still feasible, still a certainty, yet to recover a valuable portion of the health and strength, activity and energy of which he has been deprived; still possible to double his material well-being as a man, to double his serviceability as a soldier. At once, the first day he is recognized in the depôt as an embryo soldier, let him be taken to the Gymnasium, prepared, fitted, built for his reception and use; let him be placed under the care of instructors taught to administer exercise on a clearly defined and comprehensive system, a system calculated to meet the requirements of every learner, weak or strong, to meet the requirements of the whole frame of every learner, and to give to the whole frame suitable and uniform and adequate employment. Let this be done and there will be created within him a new growth, a new life; a growth for the rectification of all that is wrong, and for the strengthening of all that is weak; a life within each separate cell, straining for the recovery of that which has been neglected since his birth.

Let us take another instance. The youth who has everything to gain—slight and slim, under-sized and under-fed, who can scarcely be reckoned the raw material out of which a soldier is to be made, but who from his youth, and from that strong germ of physical ower which I have learnt to look upon as inherent the frame of every Englishman, is awaiting but e stimulating, quickening, life-giving properties of judiciously regulated exercise to swell and expand into healthy, vigorous existence. What does such a youth gain in drill and parade for the development of his latent resources? He is not twenty yet; capable of receiving vast additions to his physical powers. This as we have seen is the case with the youths at our Universities, who from their childhood have been living in that state of mental and physical employment most favourable and most distinctly conducive to timely development. They seldom attain their full bodily powers before their twenty-third year. But the youth of the nature I am instancing will be found to be greatly in arrears on all points. What is there in his professional duties to supply the want? So little, so very little, in comparison with his great requirements and almost unlimited capacity for improvement; and that little so partially and so unequally administered, that even its value is reduced. For he cannot attend a parade, walk to a rifle-range, cross a barrack-yard, or ascend a barrack-stair, without giving employment to the muscles of his lower limbs, although such employment be altogether inadequate to produce their full development; but it is abundant in comparison to what the upper limbs can receive. These must languish, these must remain relatively feeble, because they are kept without employment, and power is in relation to activity.

It is this inadequacy, this partiality of exercise employed without reference to this law, which renders gymnastics or systematized exercise so variable here; for by it only can employment suitable in nature, degree, or duration for every part of the body be provided; and while the comprehension of this law teaches us how to look for partial developments and defective and imperfect growth, it has but to be ascertained what these local wants are, what parts of the body are relatively weaker than the remainder, and such employment can be furnished as will raise any such part to the rank of the rest of the body in strength and in serviceability. And when the entire body is below the point of power to which it should have attained, suitable employment can be furnished for every part of the whole collectively—employment that can be increased and intensified with the advancing capacity of the learner. And it must never be forgotten that in developing a limb to its full power and perfect conformation, we do that, and, except indirectly, we do nothing more; whereas a glance at the trunk of the body will show that in developing the parts of which it is composed, (I might almost say, constructed, so numerous are its parts and so complex is their arrangement,) we do that and a great deal more. We not only develope to their normal shape, size, and capacity, the important muscles of the trunk, but at the same ne, and by the same process, we bring to its perfect and size the framework which encases and pro- those vital organs, whose health and functional we know to be all-important. The health of these organs, and their power of performing their functions with due completeness, are essentially dependent upon their perfect freedom; and this freedom they cannot have if confined and restricted by the narrowness, or other deviation from the natural shape and size, of this enclosing framework; they cannot attain to their full size and power if thus fettered, and no activity on their part can do other than aggravate the evil of their confinement. In thus providing therefore for their freedom in functional activity by the expansion of the chamber in which they lie, we directly aid in their development, directly increase their power.

But can I prove, can I adduce any evidence, that the system of bodily training which I advocate would meet the end desired, would adjust and regulate and place under his control the entire available resources of the strong, would take up the comparatively unformed, undeveloped, and altogether negative frame of the youth, and cultivate him into an energetic, active, and strong man? I have no hesitation whatever in saying that it will do both of these, and I believe I can give sufficient evidence that I do not over-estimate its power.

Many years ago I instituted a series of measurements, by which I could ascertain the state of the development of all pupils at the commencement of their instruction, and these measurements being repeated at given intervals, I could know the rate of their advancement. The revelations made by this system of periodic measurements have been such as to sustain me in devoting my energies to the completion and extension of this system of exercise. I find that to all, child or adult, weak or strong, it gives an impetus, a momentum in the development of his resources, which nothing else can give; and which nothing can take away, because it is not a thing acquired, a mere mental or physical addition;—it is the man altered, the man improved, the man brought nearer to the state he was designed to hold by the nature of his organization. And I think I cannot do better than give the instance of those soldiers who first received a course of training on this system [p].

✓The first detachment of non-commissioned officers, twelve in number, sent to me to qualify as Instructors for the Army were selected from all branches of the service. They ranged between nineteen and twenty-nine years of age, between five feet five inches and six
128 feet in height, between nine stone two pounds and
174 twelve stone six pounds in weight, and had seen from two to twelve years' service. I confess I felt greatly discomfited at the appearance of this detachment, so different in every physical attribute; I perceived the difficulty, the very great difficulty, of working them in the same squad at the same exercises; and the unfitness of some of them for a duty so special as the instruction of beginners in a new system of bodily exercise—a system in which I have found it necessary to lay down as an absolute rule, that every exercise in every lesson

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[p] See Appendix E.

shall be executed in its perfect form by the instructor, previous to the attempt of the learner; knowing from experience how important is example in the acquisition of all physical movements, and how widely the exercises might miss of their object if unworthily represented by an inferior instructor. But I also saw that the detachment presented perhaps as fair a sample of the army as it was possible to obtain in the same number of men, and that if I closely observed the results of the system upon these men, the weak and the strong, the short and the tall, the robust and the delicate, I should be furnished with a fair idea of what would be the results of the system upon the Army at large. I therefore received the detachment just as it stood, and following my method of periodic measurements[q], I carefully ascertained and registered the developments of each at the commencement of his course of instruction, and at certain intervals throughout its progress[r].

The muscular additions to the arms and shoulders and the expansion of the chest were so great as to have absolutely a ludicrous and embarrassing result, for before the fourth month several of the men could not get into their uniforms, jackets and tunics, without assistance, and when they had got them on they could not get them to meet down the middle by a hand's breadth. In a month more they could not get into them at all, and new clothing had to be procured, pending the arrival of which the men had to go to and from the Gymnasium in their great coats. One of these men had gained five inches in actual girth of chest. Now, who shall tell the value of these five inches of chest, five inches of additional space for the heart and lungs to work in? There is no computing its value, no power of computing it at all; and before such an addition as this could be made to this part of the body, the whole frame must have received a proportionate gain. For the exercises of the system are addressed to the whole body, and to the whole body equally, and before this addition could be made to the chest every spot and point of the frame must have been improved also—every organ within the body must have been proportionately strengthened.

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[q] See Appendix H.

[r] A tabular statement of these measurements was published in the Blue-book of the year, and are here given at length in Appendix E. And the increase there shown has been proportionately sustained wherever the system has been carried out, as I am informed by Colonel Hammersley, Director of Gymnastics in the Army, and as are shown in the regular returns of measurements furnished to him from the different Gymnasia.

But I tried another method of recording the results of the exercises. I had these men photographed naked to the waist shortly after the beginning of the course and again at its close; and the change in all, even in these small portraits, is very distinct, and most notably so in the youngest, a youth of nineteen, and as I had anticipated in him, not merely in the acquisition of muscle, but in a re-adjustment and ansion of the osseous framework upon which the les are distributed.

But there was one change—the greatest of all—and to which all other changes are but means to an end, are but evidences more or less distinct that this end has been accomplished, a change which I could not record, which can never be recorded, but which was to me, and to all who had ever seen the men, most impressively evident; and that was the change in bodily activity, dexterity, presence of mind, and endurance of fatigue; a change a hundredfold more impressive than anything the tape measure or the weighing chair can ever reveal.

Up to this point I have spoken but of the beneficial results of exercise as affecting the man, without special reference to his professional duties as a soldier; and I have done so purposely, because it is thus far that systematized exercise is valuable to all alike, and also because it will in a moment be seen that the power of the man and the serviceability of the soldier are inseparable conditions. Our embodied idea of energy, activity, and strength, is the soldier, these qualities trained to, made subservient to, the exigencies of his profession; and these qualities are the inevitable results, the incontrovertible results of that system of bodily training which I advocate, because the system itself is based upon, and all its directions are in accordance with, the natural laws which govern the growth and development of the human body. Endow a man with these qualities, therefore, and you endow him with the power of overcoming all difficulties against which such qualities can be brought to bear, against all difficulties requiring strength, activity, energy, dexterity, presence of mind, tenacity, and endurance. You cannot limit a high qualification to a single use any more than you can limit the purpose to which a good coin may be applied; it will fetch its value anywhere and in anything. And so will strong muscles and sound lungs—in garrison, in camp, or on campaign, on the march, in the field, in the transport, in the hospital, on any service, in any climate.

And while this is applicable to the soldiers of every country, how much more so, with how much greater force, does it apply to our own, who have to pass from station to station over the whole world, who have to endure the extremes of every climate, from the almost arctic cold of Canada to the tropical heat of Africa and the Indies? If physical energy and constitutional strength be the essence of power in the soldier of any other nation, they must be so with peculiar distinctness in our own, who have to exercise their profession over almost every country on the face of the globe, and to endure the hardships, the fatigues, the discomforts of them all.

The same qualities which are so valuable to the soldier are no less valuable to the youths who are about to enter on the campaign of intellectual life. It matters little whether the fight is to be fought out in the plains India, or in the green lanes of a country parish in nd. I shall never forget the reply of a soldier stion of mine, when inspecting the first squad of men who had passed through a brief course of training at the gymnasium at Warley Barracks. I asked him if he felt any stronger for his practice? 'I feel twice the man I did, Sir,' was his reply; on my further asking him what he meant by that—'I feel twice the man I did for anything a man can be set to do.'

It was just that. The man was stronger, therefore he was not more able for this thing or that thing only, but for 'anything which a man could be set to do.'

Before entering into the principles which guided me in the preparation of the system of bodily training which I here advocate, it may be interesting to glance briefly at those of other countries where the advantages of such systematic physical training has been sometime recognized, and means have been adopted to supply it.

The first attempt in modern times at a system of bodily training differed as widely as it is possible to conceive from that of the ancients. The ancient system, as we have seen, was adopted solely to give strength to the already strong, and dexterity to the already active, but made no provision for, advanced no aid, to the feeble, or inactive, or ailing. It must have been a strong conviction of this shortcoming that warped the judgment and overheated the imagination of Ling, the enthusiast Swede, when he gave the freewill-offering of a laborious life to the preparation of a system of bodily exercise in its main characteristics suitable to invalids only.

With the perseverance peculiar to the possessor of a new idea or of an unique and all-absorbing subject of study, a quality which often outstrips genius in the career of usefulness, he laboured unwearied and unrelaxing, elaborating and exemplifying the principles of his Free Exercises. Accepting that Exercise is the direct source of bodily strength and that Exercise consists of muscular movement, he therefore conceived that movement—mere motions, if they could be so systematized that they could be made to embrace the whole muscular system, would be sufficient for the development of the whole bodily powers. Carrying out this principle still further and extending its operation to those who from physical weakness were incapable of executing these movements of themselves, he argued that *passive* Exercise might be obtained; that is, Exercise by the assistance of a second person or operator, skilfully manipulating, or moving in the natural manner of its voluntary muscular action, the limb or part of the body to which it is desired the exercise should be administered.

That this last application of his theory is sound, and most valuable for the cure and amelioration of many species of ailment and infirmity, I have had the most abundant evidence supplied by my own experience. That the first is altogether erroneous has been no less fully made plain to me. The error is so deep-seated and so all-pervading, that it lies in a misconception not only of what Exercise is, but of the necessity dministering it with a reference to the condition individual, on the plain and accepted principle verns the administration of every other agent of health. And to argue that a given mode of Exercise is fit for the healthy and strong, because it is found to be beneficial to the ailing and the delicate, is to argue against all rule and precedent.

But the system of Ling, incomplete, inadequate as it was, possessed *one* of the essentials of Exercise; and therefore as soon as it was instituted good sprang from it, and good report was heard of it; and after much disheartening delay, and many rude official rebuffs, Ling saw it accepted by his country [s]. And this must be viewed as the first attempt to bring a knowledge of the structure and functions of the human body to bear upon its culture, the first attempt to lift such culture above the mere 'do them good' of other men.

The echo of this good report was heard in Germany; and Prussia, eager to avail herself of every agent which could strengthen her army, adopted it, with some additions and limitations, to form a part of the training of her recruits. But, going even beyond Ling, the supporters of the Prussian system maintain that a *few* carefully selected movements and positions alone are sufficient for the development of the human frame, and, 'simplicity' being the object chiefly held in view, this system aims merely at giving a few Exercises, these to be executed 'with great precision [t].'

There is no change in any art or branch of science, custom or usage, common to ancient or modern times, so great as in these systems of bodily Exercise. The ancient was all for the cultivation of individual energy, individual strength, individual courage; the modern aims at giving to a number of men acting in concert, the lifeless, effortless precision of a well-directed machine.

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[s] The Central Academy of Gymnastics at Stockholm was instituted in 1814.

[t] Official report, Gymnastics, 1860.

But the Prussian soldier's period of service is so short (three years) that every agent to hasten his efficiency must be seized; and it has been found necessary to provide means, in the shape of large buildings resembling riding schools, in which drill may be carried on throughout the year. And as this gymnastic system is viewed but as drill, aims but at being drill, it is, in winter, carried on in these buildings, the few articles of apparatus employed, for the sake of the advantages which they specially offer to the soldier, being erected in a corner of them. And this continuity of practice increases manifold whatever good it can yield; and thus meagre and inadequate as it is, its fruits are valuable. It is found that no other form of drill so rapidly converts the recruit into the trained soldier, and the greatest importance is attached to its extension throughout the army [u].

There is a general impression that this system forms the basis of the French. It would be difficult to make greater mistake; for not only have they, either in iple or practice, nothing in common, but in many

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entral School of Gymnastics was first established in Berlin respects they are the very antithesis of each other. So far from the boasted 'simplicity' of the Prussian system, and the desire to limit it to 'a few Exercises to be executed with great precision,' being adopted by the French, they have elaborated their system to such an extent that it is difficult to say where it begins or where it ends, or to tell not what it does, but what it does not, embrace. For quite apart, and in addition to, an extended range of Exercises with and without apparatus, it embraces all defensive Exercises, with bayonet and sword, stick, foil, fist, and foot, swimming, dancing, and singing, reading, writing, and arithmetic, if not the use of the globes. The soldier is taught to throw bullets and bars of iron; he is taught to walk on stilts and on pegs of wood driven into the ground; he is taught to push, to pull, and to wrestle; and although the boxing which he is taught will never enable him to hit an adversary, he is taught manfully to hit himself, first on the right breast, then on the left, and then on both together, with both hands at once; and last, but not least, he is taught to kick himself behind, of which performance I have seen Monsieur as proud as if he were ignominiously expelling an invader from the *sol sacré* of La Belle France. Now I know no particular reason why a soldier should not be taught all these acquirements, and I know many important reasons why he should be taught some of them; but it would be difficult to assign any reason, either important or particular, why they should be called

Gymnastics, or be included in a system of bodily training.

The fundamental idea of the French system is sound, for it embodies that of preparation and application; it is primarily divided into two parts—*Exercices Élémentaires*, and *Exercices d'Application*. The first of these, designed to be a preparation and prelude to the instruction and practice on the fixed apparatus, begin with a long series of Exercises of movement and position, *propres à l'assouplissement*. What is this all-important process of *assouplissement*—this idea, shared at home as well as abroad, by civilian as well as soldier, of the necessity of suppling a man before strengthening him? What is it to supple a man? What parts of him are affected by the process and what change do they undergo? It would be very desirable to have these questions answered, because want of suppleness is a common subject of complaint, and though often caused by apparently different processes has really but one origin.

To ascertain the full meaning of a word or phrase, it is sometimes useful first to ascertain its opposite or antithesis; and the opposite of to be *supple* is, I think, to be *stiff*. If any one is in doubt as to what that means, let him take a day's ride on a hired hack along a country road, or, for the space of a working day, perch imself upon an office-stool, and the results will be ical and indubitable—stiffness in the column of ly and in the lower limbs. And why? Because every part so affected has been employed in a manner out of accordance with its natural laws. The joints, which are made for motion, which retain their power of motion only by frequent motion, have been held motionless. The muscles, which move the joints by the contraction and relaxation of their fibres, have been subjected to an unvaried preservation of the one state or the other—the muscles of the trunk in unremitting contraction, those of the limbs in effortless relaxation. Now, one of the most important of the laws which govern muscular action is, that it shall be exerted but for a limited continuous space, and that, unless the relaxation of the muscles shortly follows upon their contraction, fatigue will arise as readily, and to as great an extent, from want of this necessary interruption to contraction as from extent of effort. And, strictly speaking, this stiffness both in trunk and limbs, although arising from two opposite states of muscular employment, results from the same cause, i. e. exhaustion; each has had one only of the two essential conditions of muscular action, that one being therefore in excess. The stiffness in the trunk of the body is caused by the ceaseless contraction of the muscles, and this state is not conducive to the rapid local circulation indispensable to the reproduction of the force expended. The opposite phase of stiffness, arising from continuous muscular relaxation, is the immediate result of causes which may be called negative—the non-requirement of nervous stimulus, the non-employment of muscular effort, entailing subdued local circulation.

The second cause of this stiffness in the trunk of the body and limbs is, that the joints have been held motionless. Viewing the joints in the familiar light of hinges, we know that when these are left unused and unoiled for any length of time, they grate and creak and move stiffly; and the hinges of the human body do just the same thing, and from the same cause; and they not only require frequent oiling to enable them to move easily, but they *are* oiled every time they are put in motion, and when they are put in motion only; the membrane which secretes this oil, and pours it forth over the opposing surfaces of the bones and the overlying ligaments, is stimulated to activity only by the motion of the joint itself.

But, it may be argued, stiffness may arise from extreme physical exertion, which has embraced both conditions of muscular action, with frequent motion of the joints, stiffness such as a man may experience after a day of unwonted exercise. The stiffness in this case, also, is simply temporary local exhaustion of power from extreme effort: the demand suddenly made has been greater than the power to supply—the waste greater than the renewal.

Stiffness, therefore, appears to be, first, a want of contractile power in the muscles which move the joints; and secondly, a want of power in the joints to be moved. It may be temporary stiffness, arising from exhaustion of the parts by extreme or unnatural action, as in the illustrations just given; or it may be permanent stiffness, arising from weakness of the parts, caused by insufficient or unsuitable exercise; but the nature of both is identical. It is a lack of functional ability in the parts affected.

To supple a man therefore is, first, to increase the contractile power of his muscles; and secondly, to increase the mobility of his joints. And as the latter are moved by the former—can only be moved by the former—all application for this purpose should be made through them.

Now, even although mere movements and positions were altogether adequate materially to develope the muscular system—materially to add to its contractile power, there is a still greater drawback than mere insufficiency in their effect upon the joints; and that is, in the danger of straining, and otherwise weakening the inelastic ligamentary bindings. For every effort of mere position has the simple and sole effect of stretching that which, from its organic structure, object, and place in the human body, is not stretchable—is not intended to yield. To recapitulate: all exercises of mere position act directly on the joints, instead of acting on them through the muscles. Such exercise is, therefore, addressed to the wrong part of the body; it is addressed to the joint, when it should be addressed to that which moves the joint. It is the old and exploded treatment of disease revived for the treatment of an abnormal physical condition—subduing the symptoms instead of waging war with the cause.

The other exercises in this first division of the French system—even if they were valuable, even if they were capable of being classified under any distinct head, or arranged in any progressive order, or admitted of graduated instruction and practice—are entirely out of place here, because from their nature they court and incite to inordinate effort. It needs no argument to prove the inconsistency of directing that men, sitting or standing, hand to hand, or foot to foot, singly or in batches, shall strain and strive against men, lift cannon-shot and hold them out at arm's length 'as long as possible[v],' or sling them to their feet to cast them to a distance 'as far as possible,' before they are allowed to put hand or foot on an ordinary ladder inclined against a wall, or to walk along a plank raised a foot or two from the ground. It needs no argument to show that this is reversing the order of exercise when measured by the amount of effort, local or general, required for its performance.

The second division of the system, consisting of applied or practical exercises (*Exercices d'Application*), embraces a very extended series, to be executed on a wide range of apparatus; and it may be broadly stated that all these exercises are valuable in either an elementary or a practical aspect—that is, either as they are calculated to cultivate the physical resources of the man, or as they may be applied to the professional duties of the soldier. I repeat, that the exercises of this division of ystem are intrinsically valuable in one or other of

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ion pour l'Enseignement de la Gymnastique dans les corps ans les Etablissements Militaires.'—Paris, 1847.

these aspects; but it must ever be viewed as a grave error, that, so far from the special aspect of each being designated, so far from their being separated and grouped, each under its proper head, they are all retained under one head, under the single designation of 'Practical Gymnastics.'

The evil which naturally and inevitably springs from this want of arrangement is the undue importance which it gives to all exercises of a merely practically useful character, above those whose object is the training and strengthening of the body. This is emphatically the case in the earlier stages of the practice, where the whole attention of the instructor should be devoted to the giving, and the whole effort of the learner should be devoted to the acquiring, of bodily power. Increase the physical resources first, and the useful application will follow as a matter of course. A pair of strong limbs will walk north as well as south, up hill as well as down dale—the point is to get the strong limbs.

Let not this principle of classification be undervalued. The question of 'What's the good of it when I've done it?' is one not unheard in the Gymnasium, and one not always easy to answer; and even could you be at all times ready with a physiological explanation of motive, process, and result, your questioner is not always a man who could understand it, and the difficulty is increased manyfold when the exercise questioned has place among others of the practical value of which there can be no question. But such classification gives at once the answer; 'It is of no use at all as a thing acquired; but if you should never do it or see it done again in all your life to come, it has served its purpose; for *you* are altered, *you* are improved, *you* are strengthened, by the act and effort of learning it.'

But men so intelligent as those who are entrusted with the administration of the French system, have perceived the propriety of a special application of the exercises practised at the close of the course of instruction. And, therefore, to the bona fide exercises of the system are added certain practices in which the men are employed in 'storming works,' and in undergoing an examination of their general proficiency.

These are the main features of the French system—a system of bodily exercise, but not a system of bodily training; based on, in many respects, erroneous principles of physical culture, yet productive of great benefit, physically and morally, to the soldier: with much that is useless, much that is frivolous, much that is misplaced and misapplied, and much that has no claim whatever to be admitted into any system of bodily exercise, military or civil—yet, upon the whole, national in tone and spirit, and, as has been proved by the avidity with which it has been practised, not unsuited for the men for whom it has been organized [x].

I have gone thus far into the principles of these tems because they may be said to embody those

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ich System of Gymnastic Exercises was organized in Central School, near Vincennes, was founded in 1852.

of all continental nations wherever a series of bodily exercises has been adopted for the distinct purpose of physical training. In pointing out the errors, shortcomings, and inconsistencies of these systems, it will have been apparent that they all spring from one cause—the absence of any clear theory of exercise itself, of any clear comprehension of what it is, of what changes it effects in the human frame, or of its mode of accomplishing them. It is now many years since I was impressed with this conviction; for before the formal adoption of either of the two last mentioned systems by their respective Governments, the elements of which they are composed were known and irregularly practised. I was impressed with the conviction, that until a theory of Exercise based upon a knowledge of the structure and functions of the body, and in perfect accordance with the laws which govern its growth and development, were formed, no system of bodily culture, civil or military, deserving of the name, could be established.

The system which I advocate is the result of my professional life—developed and matured by every means which I could bring to bear upon it by physiological theory or practical test. The period of its preparation extends over nearly a quarter of a century, for during that period I have been, as it were, standing in the midst of a living stream of men and boys flowing in from every school, public and private, in the kingdom; youths possessing every degree of physical power—

presenting every phase of physical weakness. On these, by these, every exercise in the system has been tested; its nature, its character defined and its results ascertained, its place in the progressive courses slowly and carefully determined.

When called upon therefore to provide a system of bodily exercise for the Army, I had but to add a military application to this educational one; for, whereas the purely educational system stops at the first aim, viz. the cultivation of the body only, leaving the after-use of this power to be determined by the individual wants of the possessor, a military system should be two-fold, aiming first at cultivating the body to its highest attainable capacity, and then at teaching the manner in which this physical power may be applied to professional purposes.

A military system of bodily training should be so comprehensive that it should be adapted to all stages of the professional career of the soldier; should take up the undeveloped frame of the young recruit as he is brought to the depot, and be to him in all respects a system of culture—a system gradual, uniform, and progressive—a continual rise from the first exercise to the last, in which every exercise has its individual and special use, its individual and appropriate place, which none other can fill, in the general system;—a system exercises which will give elasticity to his limbs, th to his muscles, mobility to his joints, and l, and with infinitely greater force than all, which will promote the expansion of those parts of the body, and stimulate to healthy activity those organs of the body, whose fair conformation, health, and strength will double the value of all his after life; which will give him the vital stamina that will be to him a capital upon which he is to depend, and from which he is to draw at all times, at all seasons, and under all circumstances of trial, or privation, or toil. This should be the great object to be aimed at in the early stages of the system; the strengthening, the developing of his body, muscle and joint, organ and limb; make him a man, and as a man give him power over himself. Give him that, and you give him the Malakhoff of the position; the activities, the dexterities of the art will fall into his hands.

And then, but not till then, should the practical application begin—an exposition, earnest, ample, and varied, which will show him how every article of commonest use may be utilized on emergencies to important purposes, how obstacles of every form and character may be surmounted, and how burdens of every size, and shape, and weight may be borne; which will show him also—and he will now see without much showing—how every exercise in the system has added something to this end, contributed something to this attainment, two-fold in its character, single in its object, to strengthen the man in order to perfect the soldier.

Thus the *military* aspect of Gymnastics has retained its importance in modern times. On the Continent and in our own country the military authorities have been the first to recognize the importance of systematized bodily training, and a military application of the advantages to be derived from bodily strength has thus preceded its educational or civil one. It formed, as we have seen, the bona fide military training of the youth of Greece and Rome. In modern times it was adopted by Germany to increase the value of her fast-diminishing soldiers at a time when the land was drained of its youth and of its manhood to guard the frontier. It was adopted by France from the love of activity and dexterity inherent in her sons, and their eagerness for all that tends to cultivate these qualities; and it was adopted by our own military authorities from, I think, equally national characteristics, on the strong representation that it would contribute greatly to the health and strength, moral and physical, of the army. Slowly and cautiously was this adoption made, and on confirmation of its value it has been introduced and is being carried out with a completeness unequalled in any country or at any time.

What may be called the material means of the system are being provided with no less completeness. At every military station, at home and abroad, Gymnasia planned on the fullest consideration of the pe-
requirements (as I have conceived them to be)
buildings[y] are being erected and carefully

[y] See Appendix I.

fitted up with every form of appliance to secure safety and efficiency, so that in a few years, at the present rate of advancement, every station will be provided with its Gymnasium—not the frail and meagre out-of-door erections of other countries, but large, airy, and substantial buildings; each of a working capacity proportionate to the barrack accommodation of the station—in other words, suited to the number of men quartered there. And thus will every soldier in depot, camp, or garrison, be provided with the means of bodily exercise, in the most complete form, throughout the year.

An important principle in this system, a principle perhaps the most important of all, has been that it shall be conducted by instructors properly qualified and supervised by officers regularly appointed and personally and practically acquainted with the system. This also has been carried out with equal method and completeness. Two detachments of non-commissioned officers, under the command of the officer selected by the authorities to direct its introduction and conduct its future extension—an officer specially selected for his high qualifications for the difficult work of introducing into the Army a new and hitherto entirely untried institution—were sent to Oxford to be qualified as instructors, and thence removed to Aldershot to form a normal school for the preparation of other teachers, and form the centre of the military gymnastic system [1].

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[1] The Gymnasium at Aldershot, built on the plan of the Oxford Gymnasium, was organized in 1861.

I have been thus minute in tracing in outline the principal features of the introduction of our military system—a system which has attained its present healthy and robust proportions so steadily and so silently that many are scarcely aware of its existence—that it might be seen how far a regular system of bodily training has already been carried out, and with what solidity it has been established in this country, and the importance in which it is held by the military authorities, who of all men are the most capable of estimating the value of health and strength, and of the means of obtaining them.

Now if all this arrangement and method were considered necessary in the organization of the bodily exercise of full-grown men—men of mature frame and hardy habit, and at the period of life when all the physical energies are at their highest point of power, at least as much precaution and forethought and method, it would be expected, would be adopted on its administration with boys and lads at school, whose frames are all incomplete and impressionable in the highest degree;—capable of being affected for good or for evil by every surrounding agency. But what are the facts? Except the two Military Colleges of Woolwich[a] and Sandhurst, and Radley College, not one of our large educational establishments is provided with larly organized Gymnasium with properly qua- chers, and scarcely a week passes without ne letters from the masters of schools seeking to be informed of the cost of gymnastic apparatus, *and of the manner of guiding the village carpenter in its construction.* But amongst all these letters there is scarcely one which desires to be informed as to what exercises should be done upon them when erected or how these should be administered. The plastic frames of growing boys must not be handled in this fashion—they are not things for amateurs to play with.

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[a] See Appendix F.

It should be clearly understood by every one entrusted with the care of boys that nothing can be put up in the form of actual apparatus which would be either useful or safe without adherence to a regular system, and the instruction and supervision of an efficient teacher. And I would warn every one so intrusted and contemplating such erections that little but evil can spring from neglect of the caution. I do so with an earnestness which I could only feel, and with an emphasis I could only use when the good to be obtained was at best but trifling and uncertain, and the evil to be hazarded great and undoubted. For what but evil can accrue from the untaught, undirected efforts of a group of boys, strong and weak indiscriminately mingled, gathered around the cluster of perilous machines sometimes erected in a playground and styled a Gymnasium; the strong improvising tricks which have nothing to recommend them but their danger, the weak emulating the strong? And the evil which is most to be dreaded, viz. *strains*, is precisely the very evil which should not occur—the very evil which with properly administered gymnastics *could* not occur,—which in my entire professional experience, with the thousands of young and old, weak and strong, who have passed through my hands, has never in the smallest degree occurred,—the very evil in fact which should be prevented from occurring in other exercises, even by the resultant benefits of these, because by them the parts liable to injury on effort would be strengthened and an inherited liability removed; for the universal law regulating growth and development is paramount here,—*the natural and suitable exercise strengthens, the excessive or undue exercise weakens and injures.* I repeat, falls and broken bones are not the evils to be dreaded from these hazardous exertions. Falls are seen, and broken bones can be mended; the thing to be feared is the strain from sudden, unregulated, or over-stimulated effort; an evil which at the time of its actual occurrence may never be known, or if known, concealed, for the young have a dread of such incapacitating injuries, but which whether concealed or revealed, understood or misapprehended, felt late or soon, will surely appear; it may be to mar the hope and the happiness and the usefulness of all the life to come.

The educational system as here given aims at providing a regular and progressive course of bodily training
every healthy frame at any period between childhood
ult life. I expressly say healthy frame, because
it contains many of the exercises which are
the delicate or ailing, yet no rules or regula-

tions can be laid down for the administration of exercise in such cases; this must always be done with special reference to the capacity and requirement of the individual, and, indeed, varied of necessity to suit his bodily condition from day to day. A system less complete and less definitely arranged would not meet the ends in view, would not give that guarantee to parents, and, to those who have the care of boys, that sense of immunity from danger, which is only to be obtained from a mode of bodily exertion in which every movement is pre-arranged and every possible mishap foreseen;—would not enable teachers, merely practically qualified, to carry out a plan of educational exercises with classes of learners of different ages and different degrees of bodily power. And a system less extended and varied would not present to learners that sustained attraction and interest which is essential to true advancement. For while the teacher adheres to his book of instructions and follows faithfully the carefully graduated and strictly progressive courses as they are there laid down, the learner will never be working in advance of his capacity; his ability to enter upon a new course will be determined by his ability to perform that which preceded it, the earlier exercises of the one being but slightly removed in difficulty from the later ones of the other. And thus will the learner advance from exercise to exercise, from series to series, from course to course,—from the preliminary movements of the first lesson to the most complicated and arduous exercises of the last;

his rate of advancement being always regulated by his growing capacity and strength.

But, it is said, boys have not the time for such systematic bodily culture. It might be permitted perhaps to say in reply that boys have the time for anything which is found desirable or necessary for them to do or to learn, and I have been endeavouring to show that the culture of the physical powers should accompany the culture of the mental ones, if we would cultivate either to the greatest advantage,—that is, cultivate them in accordance with the laws which determine the growth and health of both. But let us see how much time is required for this purpose—for this duty let me call it. Let us see how much time is occupied by it where the system is (and has been for several years) regularly practised—at Radley College, and at Magdalen College School for instance. The whole school is separated into three divisions, formed by age, health, strength, and physical capacity generally; each division has one regularly appointed day in each week for its lesson in the Gymnasium; each division again, on the day of the lesson, is subdivided into three classes, the boys of each class being determined on the same principles as those which regulated the primary divisions, but with a still closer regard to individual capacity. Each separate class on the day of instruction, having its own teacher, is conducted by him through the course of exercises appointed as suitable for it. By this means, as all the boys in a class are of similar capacity, the exercises being suitable to one are suitable to all; and by the same rule every boy in the school is virtually receiving instruction and practice in that course of exercise most suitable to his individual requirements. This is the regular lesson, but on occasions of wet or inclement weather, or when deprived of their expected recreative exercise, boys may attend the Gymnasium as a voluntary class on either of the other lesson-days.

Now what is the actual demand made here upon a boy's time? *One hour per week.* And this under ordinary circumstances and under ordinary conditions of health and growth is all that is required. But this implies that it will be begun early, begun with school-life, and through school-life continued.

In these arrangements there is one point which should be borne in mind, namely, that the lesson should *not* be taken from what is called play-time. *Nothing* should be taken from play-time, and nothing should be introduced into play-time but play. The lesson should be taken from actual school-time and should be regarded and reckoned as actual school-work. This alone, as a rule, will win from boys that spirit of earnestness in its practice, and yield to it that unenforced but none the less effectual means of discipline which real work claims and secures[b].

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[b] This plan I pursue in my own school, and with the most satisfactory result. Not only does the lesson take place in the regular school-time, but the boys are marked on the same scale, and in the same manner, for their conduct and position in the class, as for any ordinary school-lesson.

These are the arrangements for large schools where provision is made for the complete bodily culture of boys of all ages and stages of growth, from the earliest years at which boys leave home up to manhood. But the system is just as capable of being carried out in the smallest school as the largest. The introductory course alone, performed on the schoolroom floor, would be excellent training for young boys, and excellent preparation for the more advanced courses suitable to later years and fitter for larger schools. And the progressive courses of the system may be as strictly followed on the most meagre selection of apparatus, as in the most fully appointed Gymnasium.

I ought perhaps before closing this chapter to take some notice of the performances sometimes styled gymnastics, which have in late years obtained an undesirable degree of notoriety, because in these I recognize a distinct hindrance to a correct conception of what gymnastic exercises really are, and what they aim at doing. I allude to the dangerous and purely sensational performances in vogue at many places of amusement, which have nothing to recommend them but the peril and hazard to the life and limb of the performer at which they are performed, and the gratification of a morbid and unhealthy passion for excitement in the spectator. While such performances and such exhibitions bear the name and designation of gymnastics, all earnest-minded men, eager for the extension of true physical culture, will have a serious and irritating evil to encounter.

There are very many persons who have not the inclination, even when they have the power, to separate the spurious from the real—the baneful from the beneficial, and are content to take things as they appear, or as they are represented to them: and these may well say and well think, 'if such performances as these are gymnastics, the less our boys at our English schools know of them the better.'

No. In our day if gymnastics mean anything,—that is, anything worth the serious thought of parent, teacher, or pupil,—they mean a gradual, progressive system of physical exercise, so conceived, so arranged, and so administered, that it will naturally and uniformly call forth and cultivate the latent powers and capacities of the body, even as the mental faculties are developed and strengthened by mental culture and mental exercise.

PART II.

PRINCIPLES

OF THE

SYSTEM OF EXERCISES.

THE Exercises forming the courses of this System are arranged progressively, commencing with the most simple and initiatory, and terminating with the most arduous and severe; the former being such as will not over-task the powers of the weakest and most inexpert, and the latter such as will test and increase those of the most practised; the effort required for the performance of the exercises thus gradually increasing with the advancing capacity of the learner. The entire range constituting the system is performed with apparatus either moveable or fixed; all exercises of mere position or posture have been avoided, for in no way do they furnish adequate exercise to the healthy; they are, in fact, to his great requirements and capacity for physical exertion, but a tantalization; moreover, they are quite incompetent to maintain in their practice the pleasure and interest which are essential to the beneficial results of all exercise. And to secure these results in the present system, the exercises are given in such great variety, that while every part of the complex structure of the human body may receive ample and suitable employment, the form of such employment may be varied almost daily.

It will be seen that the different forms of apparatus or machines, by the aid of which the exercises are performed, are arranged in sections or groups in their natural order of classification, that is, upon the principle of the nature of the employment, or the nature of the movement, they severally yield; the separate exercises on each machine are arranged in progressive order, terminating with the most difficult. Thus—

SECTION I embraces the moveable apparatus, which give light and uniform employment to the entire body. (For this reason they are made to constitute the preliminary course of the system.)

SECTION II embraces all arrangements for the practice of Exercises of Progression, such as walking, running, leaping, and vaulting, which employ chiefly the lower limbs and lower regions of the trunk.

SECTION III embraces all apparatus for exercises of rotation and oscillation, as the trapezium and parallel bars, giving employment to the whole of the trunk and upper limbs.

SECTION IV embraces all climbing apparatus, as the ropes and poles, vertical and inclined, giving employment to the entire body, especially to the upper limbs and upper portion of the trunk.

From these sections are formed the preliminary course of introductory exercises, and the four progressive courses which make up the system, the titles of the courses indicating the general character of the exercises in them, as follows:—

PRELIMINARY COURSE .	*Introductory Exercises with the Dumb Bells and Bar Bells.*
RSE . .	*Simple Exercises.*
RSE . .	*Exercises of medium difficulty.*
. .	*Advanced Exercises.*
E . .	*Arduous Exercises.*

And as the greater number of the machines admit of simple, advanced, and arduous exercises, it will be found that each of these courses (save the first) extends over the principal apparatus of each section. Thus the first course (on the fixed apparatus) is formed of the initiatory exercises on each machine, all of a simple and general character; the second embraces the medium exercises on the same machines, requiring more energetic and dexterous action than the preceding; the third embraces the advanced exercises on the principal machines, calling for powerful local effort and endurance by repetition; and the fourth consists of the most arduous exercises on the same machines.

The exercises on each machine are again divided into series, the titles of which indicate either the position from which the exercises comprised in it are performed (as standing, running, &c.), or the nature of the movement composing the exercises (as marches, evolutions, combinations, &c.), or in other cases the part of the machine to be employed.

The series, the number of the exercise in it, and the course to which the exercise belongs will be found in the margin, opposite the description of each exercise.

With the view of making the work fulfil as completely as possible its object as a guide and reference on all occasions, every separate machine is prefaced by a note exponent of the nature and object of its exercises, the parts of the body which they employ, and the purpose of such employment. In these notes are carefully pointed out the duties of an instructor in every situation, his position with regard to the learner, the peculiar risks, where such exist, to be guarded against in the different exercises, and the errors most likely to be inadvertently committed in their practice, the modes in which the more complicated or difficult exercises may be gradually approached, and the different ways in which the learner may rest for a time on the machine itself, if overcome with fatigue at a distance from the ground; with other information which he may be likely to find of service.

In the text describing the position and action of the exercises, the use of technicalities has been, as far as possible, discarded, such only being retained as were found essential to clearness and the avoidance of repetitions. These are described on the page preceding Section I.

RULES

FOR CONDUCTING THE LESSON.

In the preceding note explaining the principles upon which the system is founded, it is shown that each course consists of a selection of exercises all as nearly as possible of a uniform degree of difficulty, and demanding in their performance an equal amount of muscular effort. By this arrangement the youngest beginner has as wide a range of exercises—as extended a use of the gymnasium, as the most advanced learner; for the limitations of the courses are decided by the degree of difficulty of the exercises themselves, and not by the apparatus on which they are performed; and every machine, with very few exceptions, presents exercises suited to the capacity of learners of every grade of physical power. Each course, and in a great measure each exercise in each course, leads direct to that in advance of it, so that the learner in his first efforts in his first lesson is really practising that which will aid him in mastering the most difficult exercises in the terminating course. This essentially progressive character, this gradual, uniform, onward march of the entire range of exercises from the first to the last, must never be lost sight of by the instructor, but must always be viewed by him as being the fundamental principle of the system, the main source of its value, and the chief guarantee for its safety, while it also constitutes a most powerful agent in sustaining the interest of the learner during his practice.

To give variety to the lesson, each course is made to consist of a much greater number of exercises than can be performed by the learner at any single attendance, so that the instructor is provided with ample scope for selection, by means of which he may vary the lesson almost daily, while still ranging within the prescribed limits of the course.

But there is another form of variety which it is most desirable to secure, and which, as it could not be provided for by any arrangement of section or course, must be in a great measure intrusted to the intelligence and care of the instructor. As already explained, each article of apparatus in the gymnasium is designed to give special employment to special parts of the body, in accordance with the principle that all muscular power is intermittent, and is most effectively cultivated and sustained by brief and recurring efforts. It will, therefore, be the object of the instructor to secure, by a judicious selection of the various machines during the lesson, a fair share of exertion to the several parts of the body, and to pass his class from machine to machine in such order that each successive one will call into action a new part of the body, and at the same time give rest to those employed by its predecessor.

For example, the class may begin the lesson with the exercises on the apparatus of the second section, such as the running leap, height or distance; or the running vault, right and left, on the vaulting-horse; for these exercises,
h chiefly employing the lower limbs, require no great
localized exertion, and they gradually quicken the
supple the joints, and put into light and free
number of muscles, and thus prepare the body

for more arduous efforts. To these, the frame being now at its greatest pitch of power, supple and as yet unfatigued, may aptly succeed the exercises on the elementary apparatus, such as the bridge ladder, giving strong and concentrated employment to the chest and upper limbs; to this may succeed the parallel bars, fixed or moveable, or the pair of rings, or the trapezium; for these all afford abundant employment to the trunk of the body through the medium of the upper limbs. From this point the exercises may be repeated in character, although in other forms, on different apparatus, chiefly on the vertical machines for climbing; and the lesson may conclude with those of a less arduous nature, where balance and dexterity and facility of movement are the points cultivated, to be executed on machines, horizontal and inclined, restricted to no particular section.

The lesson will always be strictly confined to the exercises of the course, and no advance into a second and higher course will be made until the exercises in the preceding one can be executed with accuracy and precision.

Each class should consist of not less than ten or more than fifteen learners. It is not desirable to preserve a too formal attitude or discipline during the lesson, while at the same time it will be readily perceived that the due observance of certain rules and regulations is necessary, not only for the sake of preserving propriety, and of securing the good government of the gymnasium, but also for the sake of the advantage to be derived from the careful performance of the exercises, and for the safety of the learners during their practice.

Under ordinary circumstances the instructor will set (i.e. perform in its perfect manner) each exercise, followed by the assistant instructor or monitor when one is attached to the class; the learners will then follow in succession in their proper order. Each learner will hold himself ready in his proper time to step up to the machine the instant his predecessor has quitted it, and on the completion of the exercise he will quietly step aside to give place to his successor, previously steadying or re-adjusting the machine when required, and take his place as indicated by the instructor, either by returning to the side of the machine from which he started, to be in readiness to follow in the next exercise, or by remaining on the side where the exercise terminated, as may be most suitable for the effective working of the machine, and for watching the performance of each succeeding learner.

The instructor will repress all laughing at the mishaps or unsuccessful efforts of beginners calculated to discourage, or annoy, or distract attention; and will strictly forbid the slightest attempt to baulk, hinder, or otherwise interfere with any one during the performance of an exercise; but this need not be allowed to mar the full enjoyment and free expression of interest felt in witnessing each other's performance, successful or unsuccessful.

The learners in one class must on no account be allowed to mix with those of another during the lesson; and the more effectually to sustain this important regulation, the instructor should select those machines, other things being suitable, which are farthest removed from those being worked by other classes.

RULES AND REGULATIONS

FOR THE

GYMNASIUM.

1. No pupil shall do any exercise without his gymnastic belt and shoes.
2. Every pupil shall hang up his clothes during exercise, and his belt and shoes after exercise, in the places appointed for those purposes.
3. No pupil shall tie knots in the ropes, or displace in any way any portion of the apparatus.
4. No pupil shall attempt any exercise which has been forbidden, or shall do on one machine an exercise which properly belongs to another (such as jumping the vaulting horses, &c.).
5. No pupil shall attempt to use, or lift from the racks any bells, or bar, heavier than those which have been allotted to him by the instructor.
6. The bells and bars must be lifted from the racks and placed in position at the target at once, and not be rolled on the floor.
7. No pupil shall fence, or play single-stick, without his mask, jacket, and glove, or thrust at another who is not so prepared.
8. No pupil shall use or displace another's belt, shoes, arms, masks, &c.

THE SYSTEM

BY SECTIONS OF APPARATUS.

SECTION I. INTRODUCTORY EXERCISES.	Movements and Positions.
	The Dumb Bells.
	The Bar Bells.
SECTION II. EXERCISES OF PROGRESSION.	Walking.
	Running.
	Leaping.
	The Leaping Rope.
	The Leaping Pole.
	The Horizontal Beam.
	The Vaulting Bar.
	The Vaulting Horse.
SECTION III. ELEMENTARY EXERCISES.	The Fixed Parallel Bars.
	The Moveable Parallel Bars.
	The Trapezium.
	The Pair of Rings.
	The Row of Rings.
	The Elastic Ladder.
	The Horizontal Bar.
	The Bridge Ladder.
	The Plank.
	The Ladder Plank.
	The Inclined Ladder.
	The Prepared Wall (embracing the Holes, the Blocks, the Grooves).

SECTION IV. CLIMBING. . . The Vertical Pole.
The Vertical Pole, fixed.
The Slanting Pole.
The Turning Pole.
The Pair of Vertical Poles.
The Pair of Slanting Poles.
The Vertical Rope.
The Rosary, or Knotted Rope.
The Mast.

THE SYSTEM

BY

COURSES OF EXERCISES.

INTRODUCTORY COURSE.

SECTION I.	FIRST PRACTICE.	*Movements and Positions.*
	SECOND PRACTICE.	*The Dumb Bells.*
	THIRD PRACTICE.	*The Bar Bells.*

SECTION II. EXERCISES OF PROGRESSION.

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Walking.	163	To walk at slow time. Short distance.	To walk at half speed. Short distance.	To walk at speed. Short distance.	To walk at speed. Long distance.
Running.	168	To run at slow time. Short distance.	To run at half speed. Short distance.	To run at speed. Short distance.	To run at speed. Long distance.

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Leaping.	177	First Series. Standing. To leap height in two movements. To leap height in one movement. To leap height in one movement, the left (or right) side leading. To leap width. Second Series. Running. To leap height in two movements. To leap height in one movement. To leap height in one movement, the left (or right) side leading. To leap width.	First Series. Standing. To leap width, to the rear. To leap width, sideways. To leap depth.	First Series. Standing. To leap height and width combined. To leap depth, to the rear. To leap width and depth combined, to the front. Second Series. Running. To leap height and width combined.	First Series. Standing. To leap width and depth combined, to the rear. The same. A second method. To leap width and depth combined, sideways.
Leaping Rope.	193	To leap height. To leap width.	To leap height, hand over hand.	The double swing.	
Leaping Pole.	197	To leap width, standing.	To leap height, standing. To leap width, running.	To leap depth, standing. To leap height, running.	

CTION II. EXERCISES OF PROGRESSION (*continued*).

	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
izontal eam.	202	First Series. Sitting. The front march. The rear march. The side march. Second Series. Upright. The front march, the left (or right) foot leading. The front march, right and left.	First Series. Sitting. The front march, hands only. The front march, both hands at once. The rear march, both hands at once. Second Series. Upright. The side march. The rear march, the left (or right) foot leading. The rear march, right and left.	Second Series. Upright. To march to the front, one foot on the beam. Third Series. Changes of Position. To change front. A second method. To change position. To rest on the beam. To pass upon the beam (two men meeting). The same, a second method. To descend from the beam.	Third Series. Changes of Position. To re-ascend the beam.
Vaulting Bar.	218	To vault over the bar in three movements.	To vault over the bar in two movements. To vault over the bar in one movement.	To vault over the bar by the back lift. To vault over the bar by the back lift, in two movements.	To vault the bar over one hand. To vault the bar with the hands only. To vault the bar with the hands only, by the back lift. To vault the bar with the hands only, over one hand. To vault the bar with

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Vaulting Horse.	226	First Series. Standing. To vault on the horse in two movements. To vault on the horse in one movement. To vault over the horse in two movements. To vault over the horse in one movement. Second Series. Running. To vault on the horse. To vault over the horse.	First Series. Standing. To vault on the horse resting on the knees. Second Series. Running. To vault on the horse resting on the knees. Third Series. By the croup. To vault to the croup. To vault to the croup, resting on the knees.	First Series. Standing. To vault on the horse resting on the feet. Second Series. Running. To vault on the horse resting on the feet. Third Series. By the croup. To vault to the saddle. To vault to the croup, resting on the feet.	First Series. Standing. To vault over the horse between the hands. To vault on the horse with one hand. To vault over the horse with one hand. Second Series. Running. To vault over the horse between the hands. To vault over the horse by the back lift. To vault over the horse with one hand. Third Series. By the croup. To vault to the croup, the legs on the right (or left). To vault to the croup, the legs passing from right to left.

SECTION III. ELEMENTARY EXERCISES.

Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
246	First Series. Travelling. The single march forwards. The single march backwards. The double march forwards. The double march backwards. Second Series. Oscillations. To clear the bar by the front. To rest on the left bar and clear the right, by the front.	Second Series. Oscillations. To clear the bar by the rear. To rest on the left bar and clear the right, by the rear. To rest on the right bar in front, and clear it by the rear. To rest on both bars in front, and clear the right (or left) by the rear. To rest on the left bar in the rear, and clear it by the front. To rest on both bars in the rear, and clear the right (or left) bar by the front.	Second Series. Oscillations. To clear the bar by the rear, second method. To pass by the rear by the single swing. To rest on the left bar in front, and clear it in the rear by the single swing. To rest on both bars in front, and clear the left (or right) in the rear by the single swing. To rest on the left (or right) bar in the rear by the single swing, and clear the right (or left) by the rear. To rest on both bars in the rear by the single swing, and clear the right by the rear.	Second Series. Oscillations. To pass by the front by the double swing. To rest on the left (or right) bar in front and clear it by the double swing. To rest on both bars in front, and clear the left (or right) bar by the double swing. Third Series. Combinations. The single march and rest forwards. The single march and rest backwards. The double march and rest forwards. The double march and rest backwards. To march above the bars, two methods.

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Fixed Parallel Bars (*continued*).				Second Series. Oscillations. To rest on the left (or right) bar in the rear by the single swing, and clear it (or the right) by the front. To rest on both bars in the rear by the single swing, and clear the right (or left) bar by the front.	
Moveable Parallel Bars.	271	First Series. Over the bars. To clear the bars, resting on the first. To clear the bars, resting on the second.	First Series. Over the bars. To clear the bars in one movement.	First Series. Over the bars. To clear the first bar by the rear and the second by the front. To clear both bars separately by the rear.	Second Series. Under the bars. To pass from the first to the second bar, both hands at once, changing front.
		Second Series. Under the bars. To pass from the first to the second bar, the right (or left) hand leading.	Second Series. Under the bars. To pass from the first to the second bar, changing front.	Second Series. Under the bars. To pass from the first to the second bar, both hands at once.	Third Series. Between the bars. To rest on the left (or right) bar and clear the right (or left) by the front.
		Third Series. Between the bars. To rest on the single bar. To rest on the double bars.	Third Series. Between the bars. To rise between the bars and rest on the single bar. To rise between the bars and rest	Third Series. Between the bars. To rise by the first bar and descend by the second	

SECTION III. ELEMENTARY EXERCISES (continued).

	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
pezium.	283	First Series. By the ropes. To rise by the single rope. To rise by both ropes. To rise by the back lift.	First Series. By the ropes. To rise by the front lift. To turn round the ropes, right and left.	Second Series. By the bar. To turn round the bar forwards. To turn round the bar backwards. To turn round the bar backwards and return. To rise above the bar, right and left.	Second Series. By the bar. To rise above the bar, both hands at once. To turn under the bar on one hand. To form the straight line. Third Series. Combinations.
Pair of Rings.	299	First Series. Evolutions. The single circle. The double circle. To turn with the feet in the rings.	Second Series. Rising between the rings. To extend the arms, right and left.	First Series. Evolutions. To turn on one hand, right and left. Second Series. Rising between the rings. To rise above the rings, right and left.	Second Series. Rising between the rings. To rise above the rings, both hands at once. To rise above the rings backwards, right and left. To rise above the rings backwards, both hands at once. To form the straight line backwards. To form the straight line forwards. To stand above the rings. To stand below the rings. Third Series. Combinations.

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Row of Rings.	312	The swing.			
Elastic Ladder.	315			The single step.	The double step.
Horizontal Bar.	319	First Series. Travelling. The right (or left) hand leading. The right (or left) hand leading, sideways (legs pendent). Right (or left) hand leading, sideways (legs bent).	First Series. Travelling. Right and left. Right and left, backwards. Right (or left) hand leading, arms bent. Both hands at once, arms bent. Hand over hand, sideways (legs pendent). Hand over hand, sideways (legs bent).	First Series. Travelling. Both hands at once, sideways (legs pendent). Both hands at once, sideways (legs bent). Right (or left) hand leading, sideways (legs up).	First Series. Travelling. Hand over hand, sideways (legs up). Both hands at once, sideways (legs up).
		Second Series. Rising to the bar. To rise to the bar (three times). To rise to the bar, the hands reversed (three times).	Second Series. Rising to and above the bar. To rise above the bar, the right (or left) leg acting. To rise to the bar (six times). To rise to the bar, the hands reversed (six times).	Second Series. Rising to the bar. To turn round the bar. To turn round the bar, the hands reversed. To rise to the bar (nine times). To rise to the bar, the hands reversed (nine times).	Second Series. Rising to and above the bar. To rise to the bar (twelve times). To rise to the bar, the hands reversed (twelve times). To rise above the bar, right and left. To rise above the bar, both hands at once. To rise above the bar backwards, right and left. To rise above the bar backwards, both hands at once. To encircle the bar.

SECTION III. ELEMENTARY EXERCISES (*continued*).

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Horizontal Bar (*continued*).			Second Series. Rising to and above the bar. To rise above the bar by the fore-arms, right and left. To rise above the bar by the fore-arms, both hands at once.		
Bridge Ladder.	337	First Series. By the sides. The right (or left) hand leading backwards. Right and left backwards. The right (or left) hand leading forwards. Right and left forwards.	First Series. By the sides. Both hands at once backwards. Both hands at once forwards.	Second Series. By the spars. The right (or left) hand leading backwards. Right and left backwards. The right (or left) hand leading forwards. Right and left forwards. The right (or left) hand leading sideways.	First Series. By the sides. The right (or left) hand leading, sideways. Hand over hand, sideways. Both hands at once, sideways. Second Series. By the spars. Both hands at once, backwards. Both hands at once, forwards. Both hands at once, sideways.

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Bridge Ladder (*continued*).				Third Series. Sitting. Right (or left) hand leading, backwards (by the spars). Right (or left) hand leading, forwards (by the spars). Right (or left) hand leading, sideways (by the spars). Right (or left) hand leading, sideways (by the sides).	Third Series. Sitting. Right and left, backwards (by the spars). Both hands at once, backwards (by the spars). Right and left, forwards (by the spars). Both hands at once, forwards (by the spars). Both hands at once, sideways (by the spars). Hand over hand, sideways (by the sides). Both hands at once, sideways (by the sides).
Plank.	355	First Series. With hands and feet. The right (or left) hand leading. The right (or left) side leading. Right and left side. Right and left, hand and foot.	First Series. Hands and feet. Both hands at once. Second Series. Hands and knees. The right (or left) hand leading. The right (or left) side leading. Right and left side. Right and left,	Second Series. Hands and knees. Both hands at once. Fourth Series. Hands only. The right (or left) hand leading. Right and left.	Third Series. Both hands at once, the legs suspended. Fourth Series. Hands only. Both hands at once.

SECTION III. ELEMENTARY EXERCISES (*continued*).

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Ladder Plank.	364	First Series. With hands and feet. The right (or left) hand leading. The right (or left) side leading. Right and left side. Right and left, hand and foot. Both hands at once. Third Series. Backwards. By the spars.	Second Series. Hands only. The right (or left) hand leading. Third Series. Backwards. By the centre.	Second Series. Hands only. Right and left.	Second Series. Hands only. Both hands at once.
Inclined Ladder.	374	First Series. Above the ladder. The right (or left) hand leading. The right (or left) side leading. Right and left side. Right and left, hand and foot.	First Series. Above the ladder. Both hands at once. With one hand. Second Series. Under the ladder. The right (or left) hand leading (by the spars). The right (or left) side leading (by the spars). Right and left side (by the spars). Right and left, hand and foot (by the spars).	First Series. Above the ladder. With the feet only. Second Series. Under the ladder. Both hands at once (by the spars). Both hands at once (by the sides). Both hands at once (by spars and sides).	Third Series. Hands only. Both hands at once (by the sides). Both hands at once (by the spars). Both hands at once (spars and sides). Hand over hand, sideways. Hand over hand, sideways (legs up). Right (or left) hand leading (above the ladder). Hand over hand (above the ladder).

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Inclined Ladder (*continued*).			Second Series. Under the ladder. Right (or left) hand leading (by the sides). Right (or left) side leading (by the sides). Right and left side (by the sides). Right and left, hand and foot (by the sides). Right (or left) hand leading (spars and sides). Right (or left) side leading (spars and sides). Right and left side (spars and sides). Right and left, hand and foot (spars and sides).	Third Series. Hands only. Right (or left) hand leading (by the sides). Hand over hand (by the sides). Right (or left) hand leading (by the spars). Hand over hand (by the spars). Right (or left) hand leading (spars and sides). Hand over hand (spars and sides). Right (or left) hand leading, sideways. Right (or left) hand leading, sideways (legs up).	
Prepared Wall.	397	First Series. ith hands and feet. The right (or left) hand leading. The right (or left) side leading. Right and left side. Right and left	First Series. With hands and feet. Both hands at once.	First Series. Hands and feet. With one hand.	Second Series. With hands only. The right (or left) hand leading. Right and left. Both hands at once.

SECTION IV. CLIMBING.

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Vertical Pole.	409	First Series. With hands and feet. The right (or left) hand leading. Hand over hand. The same. A second method.	First Series. With hands and feet. Both hands at once.	Second Series. With hands only. The right (or left) hand leading. Hand over hand. Both hands at once.	Second Series. With one hand.
Fixed Vertical Pole.	420				First Series. Hands and feet. The right (or left) hand leading. Right side leading. Right and left side. Right and left, hand and foot. Second Series. Hands and knees. The right (or left) hand leading. Right (or left) side leading. Right and left side. Right and left, hand and knee. Both hands at once.

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Slanting Pole.	426	First Series. Under the pole. The left (or right) hand leading. Hand over hand.	First Series. Under the pole. Both hands at once.	First Series. Under the pole. With one hand.	
		Second Series. Above the pole. The left (or right) hand leading. Hand over hand.	Second Series. Above the pole. Both hands at once.	Third Series. Hands only. The left (or right) hand leading. Hand over hand. Both hands at once.	
Turning Pole.	435	First Series. The right (or left) hand leading.	First Series. The pole held firm. Hand over hand. Both hands at once.	Second Series. The pole turning. The right (or left) hand leading. Hand over hand. Both hands at once.	Second Series. The pole turning. Turning with the pole.
Pair of Vertical Poles.	441		First Series. The right (or left) hand leading.	First Series. Hand over hand. Both hands at once.	Second Series. Hands reversed. Right (or left) hand leading. Hand over hand. Both hands at once.
					Third Series. Sitting. Right (or left) hand leading. Hand over hand. Both hands at once.

SECTION IV. CLIMBING (*continued*).

MACHINE.	Page.	FIRST COURSE. *Simple Exercises.*	SECOND COURSE. *Medium Exercises.*	THIRD COURSE. *Advanced Exercises.*	FOURTH COURSE. *Arduous Exercises.*
Pair of Slanting Poles.	448	The right (or left) hand leading. The right (or left) side leading.	Right and left side. Right and left hand and foot.	Both hands at once.	
Vertical Rope.	452	First Series. With hands and feet. The right (or left) hand leading. (The foot in the half turn.) The same. (The foot in the full turn.) The same. (The foot in the stirrup loop.)	First Series. With hands and feet. Hand over hand. The same. (A second method.) Both hands at once.	Second Series. Hands only. The right (or left) hand leading. Hand over hand.	First Series. With one hand. Third Series. Sitting. Right hand leading. Hand over hand.
Rosary.	463	The simple climb.			
Mast.	467			First Series. Hands and feet. Hand over hand. The hands overlapped. The hands interlaced.	First Series. Hands and feet. To walk the mast. Second Series. The hands only.

TECHNICAL TERMS.

The Step is the action, simple or compound, of which certain exercises, as climbing, are composed; every action throughout such exercises being but a repetition of the first step.

The Position is the attitude of body assumed previous to the initiatory step, and reassumed on the completion of every succeeding one.

The Reach is the point to which the hand is raised on the full upward extension of the arm.

The Half-Reach is the point, opposite the face, to which the hand is raised when the fore-arm is bent nearly at a right angle with the upper arm.

The Rest is the point, opposite the breast, to which the hand is raised or lowered when the arm is completely bent.

The Distance is the space between the hands when they are placed at the width of the shoulders, as in vaulting.

The Space is the distance between any two regularly recurring points of a machine, as the rounds of a ladder.

Yielding is the action of the body performed to avoid shock or concussion on dropping from a height, described at page 180.

The Leading hand, foot, or side, is the one which takes the lead in any exercise.

The Supporting hand, foot, or side, *follows* the leading one.

The Reversed Grasp of the hand is when the palm is turned inwards, towards the face.

The thumbs and fingers are said to be *together* when in grasping an object the thumb and forefinger do not separate; they are said to be *meeting* when they partly or wholly encircle an object and meet, or nearly so, from opposite sides.

SECTION I.

INTRODUCTORY EXERCISES.

MOVEABLE APPARATUS.

Mere movements and positions are, in themselves, of comparatively little utility; indeed, they are chiefly valuable only in as far as they faithfully represent the movements and positions of Exercises yet to be learned under more difficult conditions. Thus the movements and positions preparatory to the sword exercise, as practised in the British army, may be instanced as most valuable; yet not so much from their intrinsic merits as because they form the fundamental positions and actual movements of the various stages of the exercise afterwards to be acquired, when the difficulty will be increased by the wielding of the weapon itself.

This principle should govern and limit all Exercises of mere movement and position; they should in every instance and in all respects lead direct to a higher course of instruction; for otherwise they cease to be real, and, if divested of their reality, it is found that, at any rate with Englishmen, the earnestness of application cannot be sustained in their practice.

On this principle the introductory course of this system is based, *the design* being to organize a short and simple course which should give fair and uniform employment to every part of the body, and be capable of modification to suit the strength of every learner; which should possess the reality and attractiveness of gymnastics proper, on fixed apparatus, and which, like them, should admit of regular and definite advancement.

There are several forms of apparatus, which, to a certain extent, provide for these requirements. The Indian clubs can be augmented in weight, and thus a progressive effort be secured; but a small number of men only can use them at the same time, and the range of exercises which they present is limited, and these are in themselves not of the highest order, acting almost exclusively on the upper region of the body; they have also the serious drawback that if unskilfully used, and if the rearward action of the club in some of the exercises be not steadily resisted, this portion of the body will be abnormally developed by their practice; the base of the breast-bone with the lower ribs will become unduly prominent, the upper part of the chest proportionately flattened, and the back, between the shoulders, undesirably hollow.

A course of Exercises of considerable value, similar to those executed with the stick, may be performed with an iron bar, but they have the important drawback of being invariably viewed as a task, disliked by weak and strong.

A third form of exercise is obtainable from an arrangement of suspended weights, which are to be raised by the flexions and extensions of the upper limbs, with the lower limbs and trunk placed in varied positions. Such exercises are valuable in an elementary sense, and are in every way superior to either of the foregoing; but they have their attendant drawbacks, viz. considerable expense for apparatus, limited capabilities for class practice, and want of attractiveness in the exercises themselves.

The form of machine which has been selected for this course appears at once to fulfil all the objects desired, and to avoid all the points that seem objectionable in others.

1st. The dumb bell is familiar to every one, and has been used in this country for centuries[a]; its weight and substance are apparent, and its exercise is real and effective.

2nd. It admits of being exactly proportioned to the individual strength of each learner.

3rd. It can be adjusted to the advancing capacity of the learner, the weight of the bar and bell being augmented as his strength increases.

4th. Its exercises give fair employment to all parts of the body, and to both sides equally.

5th. They are capable of being executed not only by an entire class at one time, and by the same word of command, but by many classes, or by the entire number of men which may at one time be present in the gymnasium.

6th. The positions and movements are of the highest order, and are directly and powerfully conducive to erectness of carriage and freedom of limb.

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[a] John Northbroke, in a treatise written in the time of Queen Elizabeth, advises young men, by way of amusement, to 'labor with poises of lead or other metal;' this notable pastime, I apprehend, bore some resemblance to the skiomachia, or fighting with a man's own shadow, mentioned in one of the *Spectators*. 'It consisted,' says the author, 'in brandishing two sticks, grasped in each hand, and loaden with plugs of lead at either end; this pastime opens the chest, exercises the limbs, and gives a man all the pleasure of boxing without the blows.' It is sometimes practised in the present day, and called 'ringing of the dumb bells.'—Strutt's *Sports and Pastimes of the People of England.*

Mention has been made of the excellence of the positions of the sword-exercise; the same positions constitute the fundamental ones of fencing, and two of the same (the first and third) have been selected to form the principal positions of the exercises of this course, the bell and bar being substituted for the sword or foil.

The course is divided into three parts; the first consists simply of the *movements and positions* of the second and third practices; the object in thus giving them separately being to prepare the learners for the others, for in these Exercises accuracy of position is essential not only to their value, but to safety.

The second practice, *with the bells*, takes up the movements and positions of the first practice; it is given in one unbroken series, although it will be seen that the first four are all simple exercises, that in the fifth a complete change in the action and position takes place, and that the succeeding ones consist of repetitions of the simple ones, rising in difficulty to the closing exercise of the practice.

The third practice, *with the bars*[b], reproduces also the movements of the first practice; and, as in the second practice, a change of action and position takes place after the simple exercises, those which follow consisting of movements in repetition, also rising in difficulty to the closing exercises of the practice.

The first practice is never repeated after the learner has entered upon the second and third, but these last may, with great advantage, form a part of every subsequent course, and it is an excellent custom to close each day's lesson on the fixed apparatus with one or other of them, thus uniting in a final exercise all the learners at that time working in the Gymnasium.

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[b] This is a two-handed dumb bell. It is a French adaptation of considerable value, as are also its special exercises.

The position of the instructor should be opposite the centre, facing the class. Better time will be kept, and the spirit of the practice will be better sustained, if the instructor executes every movement himself while giving the word of command.

◆

FIRST PRACTICE.

MOVEMENTS AND POSITIONS.

Word of Command.	Action and Position.
Attention.	Position of attention, the toes at the target (Fig. 1).
Step to the rear. . .	Make a full step to the rear with the left foot, the right following.
Step to the front. . .	Resume the first position at the target.
Step to the rear. . .	As before.
Left foot forward. .	1. Move the hands to the rear, the left grasping the right arm just above the elbow, and the right supporting the left arm under the elbow (Fig. 2.) 2. Make a half face to the right, by turning on the heels, so that the back of the left heel touches the inside of the right, and the left foot is pointed straight to the front (Fig. 3).

Fig. 1.

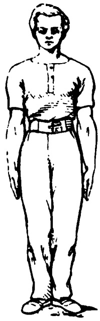


Fig. 2.

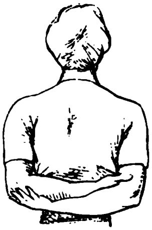
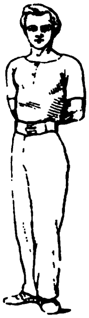
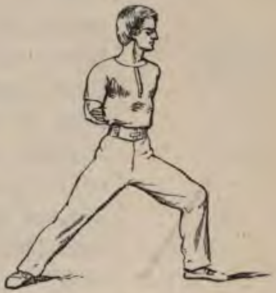
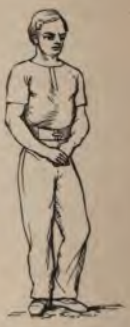


Fig. 3.



Word of Command.	Action and Position.
	3. Make a full step to the front with the left foot, the right remaining firm and flat on the ground, the knee well braced back, the hips pressed forward, the head upright, the breast advanced, the shoulders flat, the eyes directed to the front (Fig. 4).  Fig. 4.
Recover.	Bring the left foot back to the right.
Right foot forward. .	1. Face to the left, the right foot pointed straight to the front. 2. Step out with the right foot, as with the left foot forward.
Recover.	Bring the right foot back to the left.
Step to the front. . .	1. Make a half face to the right, and bring the hands down by the sides to the full extension of the arms. 2. Step to the front, resuming the first position at the target.

WORD OF COMMAND.	ACTION AND POSITION.
Stand at ease. . . .	Draw back the right foot six inches, placing the hollow of it against the left heel, bringing the weight of the body upon the right leg, the left knee a little bent; bring the hands together in front of the body, striking the palms smartly together, and slipping that of the right hand over the back of the left; the breast advanced, the eyes directed to the front (Fig. 5). Fig. 5. 
Attention.	Position of attention, the toes at the target.
Astride.	Place the left foot ten inches on the left of the target, the toes pointed to the front and slightly turned outwards, the right following at the same distance on the right, the knees slightly bent, the arms hanging straight by the sides (Fig. 6).
Ready.	Bend the knees until they jut over the toes, keeping the heels on the ground, at the same time stoop from the waist and bring both hands to the centre of

RD OF COMMAND.	ACTION AND POSITION.
	the target, the hands closed and together, the thumbs together, the knuckles to the ground (Fig. 7).

Fig. 6.

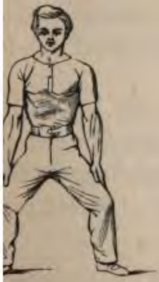


Fig. 7.

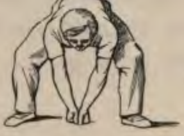
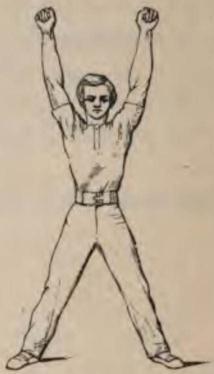
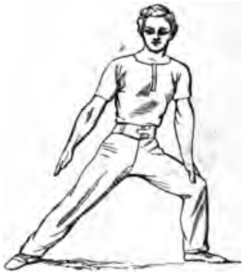


Fig. 8.



).	Straighten the back and lower limbs; at the same time bring the hands close up by the sides, and carry them to the full extension of the arms above the shoulders (Fig. 8). This exercise to be repeated six times, the learner counting the numbers, and the instructor giving the time and pitch of voice by the word 'down' at each descent. The word to be given and the numbers to be counted in a clear and full tone, the sound to be prolonged over

Word of Command.	Action and Position.
	the time occupied in the ascent from the waist to the full extension of the arm[a].
Halt.	Lower the hands to the sides, and come to the position of attention behind the target.
Step to the rear. . .	As before.
Step to the right. . .	Make a full step to the right front (at the angle at which the toes are pointed from the position of attention), the left following.
Step to the left. . .	1. Make a half face to the left. 2. Make a full step to the left with the left foot, the right remaining flat and firm on the ground, the knee braced back, Fig. 9.  and at the instant that the foot meets

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[a] This exercise may be varied by retaining the knees bent, as in figure 6, during the elevation of the Bells.

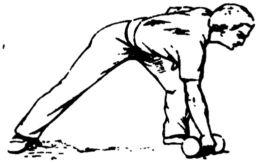
WORD OF COMMAND.	ACTION AND POSITION.
	the ground let the left hand grasp the thigh just above the knee, the thumb inside, the fingers outside, the lower part of the leg and left arm forming a straight and continuous line from foot to shoulder, the right arm remaining extended in the line of the right leg (Fig. 9).
Face to the right. . .	Turn on the heels, facing to the right, reversing the position of both lower and upper limbs.
Attention.	Come to the position of attention, the toes at the target.
Stand at ease. . . .	As before.

* * *

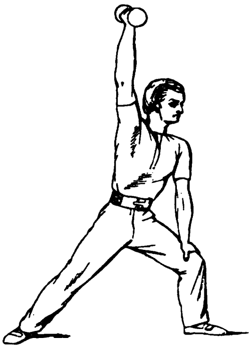
SECOND PRACTICE.

THE DUMB BELLS.

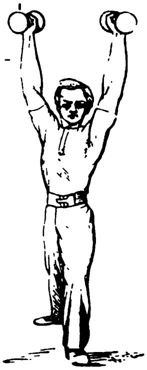
EXERCISE. No. I.

WORD OF COMMAND.	ACTION AND POSITION.
Attention.	As in first practice, the bells together on the target, the toes at the bells.
Step to the rear. . .	As in first practice.
Left foot forward. .	Make a half face to the right and step to the front with the left foot as in first practice, the left hand grasping the thigh just above the knee, as the foot comes to the ground, the right arm extended in the line of the right leg. Fig. 10. 
Right hand. . . .	Seize the bell with the right hand, the lower limbs remaining in position (Fig. 10).
Up.	Raise the bell above the shoulder (bending the arm during the ascent) to the full extension of the arm, leaning strongly on the left knee and pressing the breast to the front during the

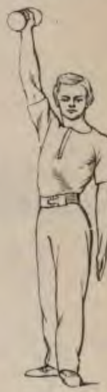
EXERCISE. No. I (continued).

Word of Command.	Action and Position.
	ascent of the bell; in this position the left leg to the knee, and the left arm Fig. 11.  should form one continuous line from foot to shoulder (Fig. 11).
Down.	Lower the bell, replace it on the target, and recover,—as in first practice.
Right foot forward. .	As in first practice.
Left hand.	Seize the bell with the left hand, the lower limbs remaining in position.
Up.	As with the right hand.
Down.	As with the right hand.

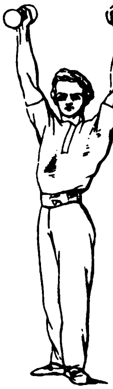
EXERCISE. No. II.

WORD OF COMMAND.	ACTION AND POSITION.
Left foot forward. .	As before.
Both hands. . . .	Seize a bell in each hand, the arms passing on either side of the knee, the right on the right, the left on the left side.
Up.	Raise the bells above the shoulders (bending the arms during the ascent) to the full extension of the arms, keeping the left knee bent, and pressing the breast to the front during the ascent of the bells (Fig. 12). Fig. 12. 
Down.	Bring the bells straight down by the sides, replace them on the target, and recover.
Right foot forward. .	As before.
Both hands. . . .	As before.
Up.	As before.
Down.	As before.

EXERCISE. No. III.

Word of Command.	Action and Position.
Left foot forward. .	As before.
Recovering. Right hand.	Seize the bell with the right hand.
Up.	Recover, and at the same time elevate the bell above the shoulder to the full extension of the arm (Fig. 13). Fig. 13. 
Left foot forward. .	Step to the front with the left foot, retaining the bell at the elevation above the shoulder, and pressing the breast to the front.
Down.	As before.
Right foot forward. .	As before.
Recovering. Left hand.	Seize the bell with the left hand.
Up.	As with the right hand.
Right foot forward. .	As with the left foot forward.
Down.	As before.

EXERCISE. No. IV.

WORD OF COMMAND.	ACTION AND POSITION.
Left foot forward.	As before.
Recovering. Both hands.	Seize the bells as in second exercise.
Up.	Recover, and at the same time raise both bells above the shoulders to the full extension of the arms (Fig. 14). Fig. 14. 
Left foot forward.	As before, retaining the bells at the elevation.
Down.	As before.
Right foot forward.	As before.
Recovering. Both hands.	As before.
Up	As with the left foot forward.
Right foot forward.	As with the left foot forward.
Down.	As before.

EXERCISE. No. V.

WORD OF COMMAND.	ACTION AND POSITION.
Step to the front. . .	As in first practice.
Astride.	As in first practice (Fig. 15).
Up and down. (*Six times.*) *Ready.* .	As in first practice stoop from the waist, and seize the bells, one in each hand (Fig. 16).
Up.	The action and position of the ascent as in first practice, carrying the bells above the shoulders (Fig. 17).
Down.	Lower the bells, letting them swing to the rear between the legs, the instructor giving the word 'down,' the learners counting the numbers, as directed in first practice.
Halt.	Replace the bells on the target, and resume the position of attention.
Step to the rear . .	As before.

Fig. 15.

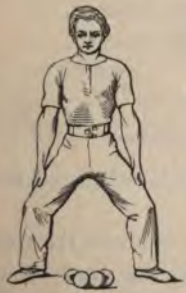


Fig. 16.

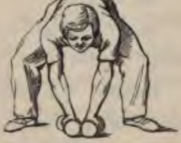
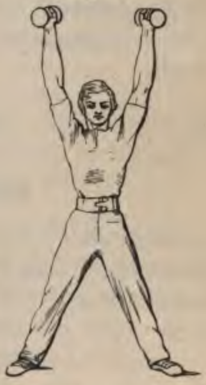


Fig. 17.



EXERCISE. No. VI.

WORD OF COMMAND.	ACTION AND POSITION.
Left foot forward.	As before.
Right hand. (*Six times.*) *Ready.*	Seize the bell with the right hand, as in first exercise.
Up.	Repeat the first exercise six times, the instructor giving the word 'down,' the learners counting the numbers, as directed in first practice.
Halt.	Replace the bell on the target and recover.
Right foot forward.	As before.
Left hand. (*Six times.*) *Ready.*	Seize the bell with the left hand.
Up.	As with the left foot forward.
Halt.	As with the left foot forward.

EXERCISE. No. VII.

WORD OF COMMAND.	ACTION AND POSITION.
Left foot forward.	As before.
Both hands. (*Six times.*) *Ready.*	Seize the bells, one in each hand, as in second exercise.
Up.	Repeat the second exercise six times, the instructor giving the word 'down,' the learners counting the numbers.
Halt.	Replace the bells on the target and recover.
Right foot forward.	As before.
Both hands. (*Six times.*) *Ready.*	As before.
Up.	As with the left foot forward.
Halt.	As before.

EXERCISE. No. VIII.

WORD OF COMMAND.	ACTION AND POSITION.
Left foot forward.	As before.
Recovering. (*Six times.*) *Right hand.*	Seize the bell with the right hand.
Up.	Repeat the third exercise six times, recovering at each elevation of the bell, the instructor giving the word 'down,' the learners counting the numbers.
Halt.	Replace the bell on the target and recover.
Right foot forward.	As before.
Recovering. Lefthand.	Seize the bell with the left hand.
Up.	As with the left foot forward.
Halt.	As before.

EXERCISE. No. IX.

Left foot forward.	As before.
Recovering. (*Six times.*) *Both hands.*	Seize the bells as in fourth exercise.
Up.	Repeat the fourth exercise six times, recovering at each elevation of the bells, the instructor giving the word 'down,' the learners counting the numbers.
Halt.	As before.
Right foot forward.	As before.
Recovering. (*Six times.*) *Both hands.*	Seize the bells as with the left foot forward.
Up.	As with the left foot forward.
Halt.	As before.
Step to the front.	As before.
Places.	Stoop from the waist and seize the bells, and place them in the racks.

THIRD PRACTICE.

THE BAR BELLS.

EXERCISE. No. I.

Word of Command.	Action and Position.
Attention.	As in first practice, the bar along the centre of the target, right and left.
Step to the rear.	As in first practice.
Left foot forward.	As in first practice.
Ready.	Seize the bar at the distance with both hands, the fingers over the bar, the thumb under, the lower limbs remaining in position (Fig. 18).
Up.	Raise the bar above the head (bending the arms during the ascent) to the full extension of the arms, pressing the breast to the front, with the head erect, the eyes directed to the front, leaning strongly on the advanced leg, and the rear leg held straight and firmly braced back (Fig. 19).

Fig. 18.

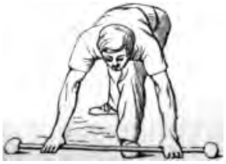
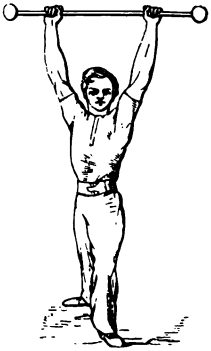


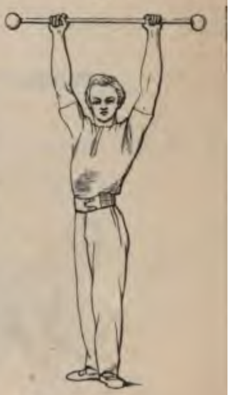
Fig. 19.



EXERCISE. No. I (continued).

WORD OF COMMAND.	ACTION AND POSITION.
Down.	Lower the bar with the arms bent, replace it on the floor and recover.
Right foot forward.	As before.
Ready.	As with the left foot forward.
Up.	As with the left foot forward.
Down.	As before.

EXERCISE. No. II.

Left foot forward.	As before.
Recovering. Ready.	Seize the bar as in first exercise.
Up.	Recover, and at the same time elevate the bar above the head to the full extension of the arms (Fig. 20). Fig. 20. 
Left foot forward.	Step to the front with the left foot, retaining the bar at the elevation above the shoulders, and pressing the breast to the front.
Down.	As in first exercise.
Right foot forward.	As before.
Recovering. Ready.	As with the left foot forward.
Up.	As with the left foot forward.
Right foot forward.	As with the left foot forward.
Down.	As before.

EXERCISE. No. III.

WORD OF COMMAND.	ACTION AND POSITION.
Step to the right. . .	Make a half face to the right, and step to the right as in first practice, bringing the toes of the right foot just within the bell, the left following, the heels touching each other.
Step to the left. . .	As in first practice.
Ready.	Seize the bar at the centre with the right hand (Fig. 21).
Up.	Raise the bar above the head and hold it in a horizontal line at the full extension of the arm (Fig. 22).
Down.	Lower the bar with the arm bent, and replace it on the ground, and replace the right arm in position, extended in the line of the right leg.

Fig. 21.

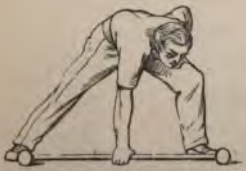
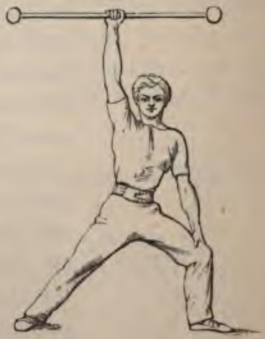


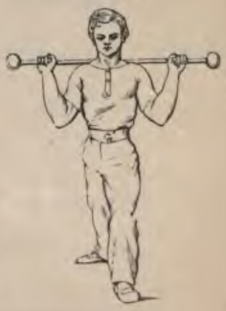
Fig. 22.



EXERCISE. No. III (continued).

WORD OF COMMAND.	ACTION AND POSITION.
Face to the right. . .	As in first practice.
Ready.	Seize the bar at the centre with the left hand.
Up.	As with the right hand.
Down.	As with the right hand, and come to the position of attention at the target.
Step to the rear. . .	As before.

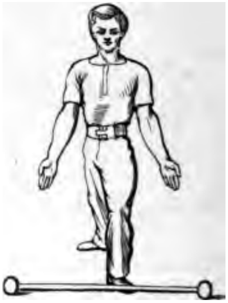
EXERCISE. No. IV.

Left foot forward. .	As before.
Ready.	Seize the bar as in first exercise.
Up.	As in first exercise.
On the shoulders. (*Six times.*)	Lower the bar by the rear until it descends upon the shoulders, pressing the breast to the front, and leaning strongly on the left knee (Fig. 23). Fig. 23. 
Up.	Elevate the bar to the extension of the arms; the instructor giving the word 'up,' the learners counting the numbers.

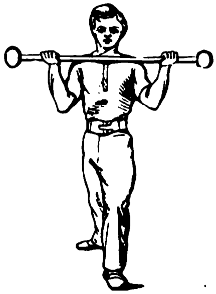
EXERCISE. No. IV (continued).

WORD OF COMMAND.	ACTION AND POSITION.
Down.	Lower the bar by the front at the full extension of the arms, replace it on the ground, and recover.
Right foot forward.	As before.
Ready.	As with the left foot forward.
Up.	As in first exercise.
On the shoulders. (*Six times.*)	As with the left foot forward.
Up.	As with the left foot forward.
Down.	As before.

EXERCISE. No. V.

Left foot forward.	As before.
Hands reversed.	Extend the arms to the front, turning the palms of the hands upwards (Fig. 24). Fig. 24. 
Ready.	Seize the bar at the distance, the palms of the hands under the bar.
Up.	Raise the bar above and slightly in front of the head, to the full extension of the arms.

EXERCISE. No. V (continued).

WORD OF COMMAND.	ACTION AND POSITION.
On the breast. (*Six times.*)	Lower the bar by the front until it descends upon the breast, pressing the breast to the front, and leaning strongly on the left knee, the head slightly held back, the eyes directed to the front (Fig. 25). Fig. 25. 
Up.	Elevate the bar to the extension of the arms; the instructor giving the word 'up,' the learners counting the numbers.
Down.	As in fourth exercise.
Right foot forward. .	As before.
Hands reversed. . .	As before.
Ready.	As with the left foot forward.
Up.	As with the left foot forward.
On the breast. (*Six times.*) *Up.* . .	As with the left foot forward.
Down.	As before.

EXERCISE. No. VI.

WORD OF COMMAND.	ACTION AND POSITION.
Left foot forward.	As before.
Up and down. (*Six times.*) *Ready.*	Seize the bar as in first exercise.
Up.	Repeat the first exercise six times, the instructor giving the word 'down,' the learners counting the numbers.
Halt.	Replace the bar on the ground, and recover.
Right foot forward.	As before.
Up and down. (*Six times.*) *Ready.*	As with the left foot forward.
Up.	As with the left foot forward.
Halt.	As before.

EXERCISE. No. VII.

Left foot forward.	As before.
Recovering. (*Six times.*) *Ready.*	As in first exercise.
Up.	Repeat the second exercise six times, the instructor giving the word 'down,' the learners counting the numbers.
Halt.	Replace the bar on the ground, and recover.
Right foot forward.	As before.
Recovering. (*Six times.*) *Ready.*	As with the left foot forward.
Up.	As with the left foot forward.
Halt.	As before.
[illegible] *the front.*	As before.
[illegible]	Stoop from the waist and seize the bar, and place it in the racks.

SECTION II.

EXERCISES OF PROGRESSION.

THE exercises of this section are for the purpose of giving accuracy and precision to the movements of the body, rather than of endowing it with great muscular strength; and have for their object the enabling it to preserve its equilibrium under special difficulties of position, and to pass with ease and rapidity from one locality to another, rather than to overcome great resistance.

If the learner were to ask, 'Why do I find it more difficult to stand upright than to sit, and more difficult to sit than to lie flat on my back?' the answer might be, 'Because in the first-named position there is considerable difficulty in preserving the equilibrium of the body, in the second, very little, and in the last, none at all.' If the question were carried further, 'What is meant by preserving the equilibrium of the body, and why is it more difficult in the first-named position than in the second, and why in either of these more difficult than in the third?' the answer is equally ready, though not so concise. By the universal law of attraction, every material object has a tendency to attract to its centre every other such object. But as this attractive force is in relation to the size of the object, and as the earth is incomparably larger than any object on its surface, it has the power of neutralizing the individual attractive force of any such objects, to draw them towards its own centre, and thus to hold them on its surface. To enable any object thus attracted to retain its position, it is not necessary that its entire surface should be brought in contact with that of the earth, because a principle by which this force is governed is, that it is directed from centre to centre,—from the centre of the object attracting to the centre of the object attracted,—not the actual centre of its bulk, but that of its substance, the spot around which all the remainder is, as it were, grouped equally on every side. It is, therefore, only necessary that one point should adhere to the ground, but it is necessary that this point should be in a direct line below the central spot. This spot is called the centre of gravity, and that part of the surface coming in contact with the ground is called the basis of support.

Everything, therefore, on the earth's surface, animate or inanimate, is held by this central grasp, and whenever the centre of any object is changed, whether by its own action or by extraneous influence, the line of attractive force is also changed, and the process is to pull that part towards the ground which has now become the centre.

To meet the demands of this inevitable law, animated creatures, with whom locomotion, implying a constant shifting of the centre of gravity, is a necessity to existence, are endowed with other forces, the chief of which is muscular contraction. But this muscular power is itself subject to and governed by certain fixed laws, and one of the most
rtant of these is that it shall be exerted but for a
continuous space; and thus, unless the relaxation

of the muscles shortly follows upon their contraction, fatigue will arise as readily and to as great an extent from want of this necessary interruption to contraction as from amount of effort.

The answer to the opening question is thus virtually given in these remarks: when lying on the back the basis of support is equal to the entire body; it is, therefore, impossible to disturb its equilibrium, not a single fibre of any muscle is called into action to preserve this position, it is one of perfect repose. When sitting, the basis of support is still large, being equal to the width of the hips. But as the trunk itself is held in an upright position by muscular effort, and as the head and neck can only be sustained in the line of the trunk by muscular effort, and as in this position there is little or no alternation of contraction and relaxation, a certain amount of fatigue is experienced in maintaining it; it is a position of semi-repose only.

When standing, the basis of support is reduced to the space enclosed by the feet, while the line of the centre of gravity must pass through the elongated body, the heaviest portions being the farthest removed from the supporting basis; and thus the preservation of the equilibrium becomes a matter of muscular contraction; every finger lifted, every breath inspired and expired, changes the centre of gravity and necessitates muscular contraction to re-adjust and re-establish it.

From this erect position—in this erect position, more or less modified and varied by circumstances, all the modes of human locomotion are performed; and all the exercises in this section of the system are for the purpose of *promoting the locomotive powers.* These exercises are walking, running, leaping; and these again are varied when executed on, or by the assistance of, apparatus, as walking on the beam, leaping—with or without run—over a barrier, with the assistance of rope or pole, or by the aid of the barrier itself as in vaulting.

◆

WALKING[a].

WALKING comes the first in order among the exercises of progression[b].

In walking the whole column of the body is slightly inclined to the front; the lower limbs are lightly lifted upward and forward, with every extensor muscle relaxed, and every joint mobile and free, and with a slight lateral oscillation of the body, marking the advance and rest of the foot, right and left, which is perceptible in the jostle and separation of two men walking at close order without keeping step. The foot is not placed flat, or all at once, upon the ground—indeed in rapid walking the whole of the foot is never on the ground at the same time. The heel first meets the ground, and the contact gradually extends from it to the toes, the heel being lifted by the time this act is accomplished. The arms are allowed to swing to front and rear in alternated action with the lower limbs[c].

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[a] See Appendix K.

[b] A clear distinction must, at the outset, be drawn between walking and marching, as taught in military drill. The latter must ever be regarded as a military exercise, in which the soldier, for professional considerations, is taught to preserve an attitude more or less formal and constrained; the former has but one object, viz. facility of progression, and every point of position and action is made subservient to this end. Military drill, however, from the very circumstance of its being an exercise in which the action and position of the different parts of the body, during locomotion, are systematized and prearranged, is most valuable to the young and growing, and should be regularly taught in schools. It is admitted that, as a rule, boys dislike drill, but this I am sure is in a great measure owing to the monotonous manner in which it is taught, and the want of tact and discrimination frequently shown by the instructor. Boys, and especially little boys, usually have it not only too frequently and too much of it at a time, but they are kept at the commencement too long, at the least attractive, although very important, parts of it; i.e. *the balance steps*, *facings*, and *slow time*. I find it is better to pass over these quickly, and to take up the more palatable *quick step*, *stepping short*, *stepping out*, *forming fours*, &c.; and at short intervals to return to pick up a little of what was prematurely passed. The drill never exceeds half an hour, once or twice a week, and in fine weather only.

The remarkable mechanism of the human foot itself emphatically teaches the manner of its use. The heel, which first comes in contact with the ground and receives the whole superimposed weight, is composed of a single solid bone, capped with the most powerful tendon in the body, and with a cutaneous covering many times thicker than is to be found on any other part of the body, the whole presenting a smooth and rounded surface, firm but elastic, yielding to strong pressure, but instantly recovering its rounded form on the pressure being removed. Immediately in front of the heel springs the arch of the instep, over which the burden of the body is transferred to the front of the foot. Here the structure changes entirely to meet the change in the duty to be performed; there is no shock to be encountered, so the strong single bone of the heel, overlaid with firm muscle and thick cuticle, gives place to a different mode of construction,—to many bones of different sizes, also protected with muscles and ligaments and cuticle, but softer and more sensitive, spread upon a broader surface, and with many prominences and indentations to take advantage of every inequality of ground: for the requirement here, on the poise of the body, is stability rather than strength; and to complete this security the whole line of the front edge of the foot is divided into five separate parts (toes) of different lengths, dimensions, and degrees of strength, allowing each separate part, while acting in concert with all the others, to take its individual grasp of the ground according to the nature of the surface on which it rests. This terminating act in the compound movement composing the step is so important that a large portion of the leg also is fashioned and placed to aid in its performance; the mass of muscle forming the calf of the leg has for its primary object to raise or lift the heel, while the toes have yet the ground for fulcrum, anticipatory of the forward act of propulsion of the next step; and it is this gradual, springy action, which at once gives development to the limb, and in return receives from the limb elasticity and spring in proportion to its development.

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[c] It must be premised that it is difficult, if not impossible, to lay down laws and rules to be observed by all in the performance of these three modes of progression, or, as they may be termed, *natural* exercises—walking, running, and leaping. It is found that many men, from organization or habit, have a mannerism, i. e. a special mode of gait, action, or preserving position, which although an error on *general* grounds, has, from such special causes, become serviceable to them, and which to alter would often be to reduce not to add to their power.
re such distinctive mannerism exists the aim should rather be
ate the natural capacities in this particular style of execution
est point, always admitting that the mannerism would
fy the effort in competitive trials.

The initiatory practice in walking should be performed quite irrespective of time, correct action and position being the sole points to be aimed at; these acquired, the longer courses should be used.

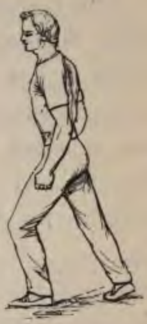
The action and position in walking are the same for all degrees of speed, except that as the speed is increased all the features of the position become more distinct and prominent, and all the points of the action are intensified: the step will be wider, yet never so wide as to cause additional effort; a stronger act of propulsion will come from the rear foot, a more distinct transition from heel to toe will take place on the advanced one; and the natural oscillation of the upper limbs to front and rear, alternating with the action of the lower ones, will become more energetic and in a great measure regulated by the muscular contraction of the limbs themselves.

SLOW TIME. SHORT DISTANCE.

Exercise 1.
COURSE I.

Advance the left foot a free step, at the same time incline the column of the body to the front; the head, neck, trunk, and right leg forming a line slightly slanting from rear to front; the right heel raised from the ground, the lower limbs supple, the left knee bent, the right nearly straight; the arms hanging naturally by the sides, the palms open, but not spread, and turned inwards towards the thighs, but not touching them; the fingers together but not extended; the whole column of the body unconstrained; the head and neck perfectly free (Fig. 1).

Fig. 1.



Press lightly from the right foot, quit the ground and let the limb swing to the front, the body retaining its forward inclination. When the right foot has swung to the front the length of the step, softly place it on the ground, the heel first, the toes last, and as these descend raise the heel of the left, now relieved of the weight of the body, which will have been transferred to the right. Repeat.

After the slow time, in order to acquire correct action and position, walking should be practised as follows:—

Exercise 2. COURSE II.	At half speed . . . Short distance.
Exercise 3. COURSE III.	At speed . . . . . Short distance.
Exercise 4. COURSE IV.	At speed. . . . . . Long distance.

RUNNING[a].

THE exercise of running is, in both action and position, different from that of walking. In the former there is but one foot on the ground at a time, and immediately after the completion of each step both feet are removed from the ground. There is no gradual descent and rise, no marked transfer of superimposed weight, no distinct point of change of the centre of gravity. At first, and before the full rate of speed is attained, the body is inclined to the front as in walking, but the speed being attained, and the proper momentum acquired, the column of the body is involuntarily brought towards the vertical line by the rapid and sustained advance of the lower limbs. In walking, progression is accomplished by a succession of separate steps, each step beginning only on the termination of the preceding one, each successive step requiring a re-adjustment of equilibrium, and a distinct renewal of propulsive effort. Running is more like a succession of leaps, every bound possessing part of the forward momentum of its predecessor, this momentum being sustained or augmented by the energy of the flexions and extensions of the lower limbs.

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[a] See Appendix K.

With a man unaccustomed to running, I would say, let him begin with a mile; setting himself to cover the distance in about eight or nine minutes, at the easiest pace and make-believe race he can run in. Let him break from his walk to the ground into this easy trot, and practise it until he find his wind decidedly improved, and the work, such as it is, pleasurable. He may then do one of two things—either increase the distance by another half mile, to be run at the same pace, or hold to the first course and cover the distance in one or two minutes less. When the mile can be run in six minutes as easily as it was run in eight, let the tactics be changed; let him break the uniformity of the run, and cultivate variety of pace; let him begin the race, as at first, at an easy trot; keep at it for a quarter of the distance to allow the organs of respiration and circulation to take up gradually the accelerated action which is demanded of them as soon as the trotting begins, allowing also the muscles employed in locomotion to take up *their* accelerated action when the walking is relinquished; let the second quarter be done in the same style but at a somewhat quickened pace, still keeping within the margin of easy performance; and let the third, if the preceding causes no distress, be quicker still, gradually culminating towards its close to an effort at the utmost strain of the powers; and last, let it subside in the fourth quarter gradually into the first easy trot, ending in the effortless walk.

to allow the throb of the heart and swell of the arteries and veins to subside and settle down, and the lungs to resume their peaceful tidal motion, and the air current in their cells its rythmical ebb and flow.

In training for the performance of some difficult pedestrian feat, the exercise should be begun and conducted with the greater method and care, and all its separate features should be studied, and every other exercise enlisted in its service which can be brought to bear upon the parts of the body employed; both as aids to local muscular power by developing the voluntary muscles directly engaged in locomotion, and the involuntary muscles and all parts of the frame engaged in respiration.

In running, as in walking, there are three points to be specially observed,—

1st. The length of stride.
2nd. The rapidity of step.
3rd. The endurance; or that stamina which enables a man to continue the exertion, and repeat indefinitely the step without reduction of its other two qualities—of rapidity and length.

For the first quality length of limb is undoubtedly the chief requisite, and may be said therefore rather to be inherited, when possessed, than acquired; although not entirely, as the freedom and fulness of the stride be *facilitated* by promoting the mobility of the joints connecting the lower limbs with the trunk, and it is greatly owing to the neglect of this point when we see men, as we often do, stepping under their stride; and the habit of stepping short once acquired, it is very difficult to relinquish it without encroaching on the second quality, rapidity. Length of stride is however so very valuable, that no care and no labour should be spared in cultivating it. If but one inch in the step be gained, without trenching on its velocity, it will give fifty yards in the mile.

For the second quality, *rapidity*, there is still something due to possession by inheritance, though undoubtedly more is left to culture; some men in addition to great mobility of joint and extreme rapidity of muscular contraction, show an aptitude for these exercises of progression and a facility of execution of the movements required which no care and no culture of itself can ever give; and this too without any apparent cause from shape or size of limb. They also show a kind of instinctive liking for these exercises, quite inexplicable, and are drawn in the direction of their practice quite involuntarily and irresistibly. Others again with unwearied efforts never exceed mediocrity [b].

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[b] I have, in my own practice, proved that endurance and velocity are essentially different qualities, and that a man may have one in fair degree without the other. I have never been able to exceed six miles in the hour, although I have frequently walked sixty with and without knapsack, without experiencing extreme fatigue, or unfitness for the road next day.

The third quality, *endurance*, when it is one of physical stamina, is less due to condition of limb than general power of body; when of respiratory power it is of course due to the condition of the respiratory organs, and the conformation and size of the chest.

This quality of endurance is more susceptible of improvement by judicious culture than either of the other two, whether the line of culture be in the direction of muscular or respiratory power; its limit not being fixed absolutely, like the first quality, nor partially, like the second.

Training exercise for feats of pedestrianism involves much care and unwearied and unceasing application. The fundamental principle with this, as with all other exercises, is first to ascertain practically at the commencement of the training the actual capacity of the body at the special mode of exertion required, and then gradually, day by day, and week by week, to observe the parts of the body which feel the exertion most, that they may be assisted and strengthened by other exercises; for the *sameness* of the movements and modes of action in one exercise will fatigue, when another mode of employment will stimulate to renewed effort and give increased vigour.

If speed for a short distance be the object desired, this pace should be slowly and gradually approached ntil it can be sustained over a portion of the course, *then*, stride by stride, extended until the whole course can be covered within the time desired. If it be wished still to lessen the time, the whole attention should be given to the quickening of the step—it being assumed that the full length of stride has been already acquired. Indeed neither rapidity nor duration should be seriously attempted until this quality has been cultivated and its extent determined. If the speed be satisfactory but not the distance, I consider it the better method first to note the distance that can be done at the pace desired, and then daily, if only stride by stride, extend it, rather than to cover a greater distance with a general reduction of speed; inasmuch as I consider it to be less difficult to extend a course at a pace already acquired than to increase the speed over a longer course, which can only now be covered at a slower pace. But regulations of this kind must give way when they clash with preconceived impressions or opinions, for in all such matters there is an individual suitableness to be consulted, and strong fancies and prejudices have much readiness to establish themselves as facts.

To run a short distance, such as a hundred yards race, rapidity of step is probably the first quality; as the distance increases, as in the quarter or half-mile race, length of stride is probably of the greatest importance, or at least of equal importance with rapidity; and when the race is what is distinctly recognized as a long course, such as the mile or more, or combining distance with obstacles, such as the steeple-chase, then endurance takes the most prominent place and passes probably from muscular to respiratory effort.

A correct action and position, quite irrespective of time, should first be obtained; these should then be practised at half speed, and ultimately at the highest rate of speed.

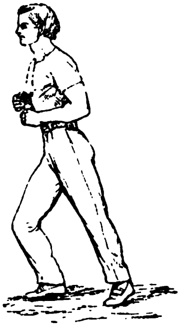
When, in addition to the proper action and position, the proper and uniform rate of speed has been acquired, the race may be extended to the quarter and whole mile.

Long distances, such as five or ten miles, may also be practised, with emulation, but systematically, and above all progressively, both as regards distance and speed. There is much art in husbanding and profitably spending the physical resources in both modes of progression, and there is no exercise in which men can be engaged where fatigue so soon and so distressingly supervenes, if unskilfully performed.

SLOW TIME. SHORT DISTANCE.

Exercise 1. COURSE I. The position the same as in walking, except that the arms are bent at the elbows; the fore-arm held in a horizontal line, the hands to the front and closed, the thumbs inwards (Fig. 1).

Fig. 1.



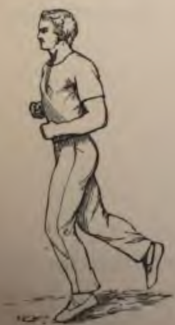
The step also the same as in walking, except that the left foot is lifted before the right reaches the ground; the knees are more bent than in walking, the foot is lifted farther from the ground, and the column of the body pressed more strongly *to the front.*

After the slow time, in order to acquire correct action and position, running should be practised as follows :—

Exercise 2. COURSE II.	At half speed	Short distance.
Exercise 3. COURSE III.	At speed	Short distance.
Exercise 4. COURSE IV.	At speed	Long distance.

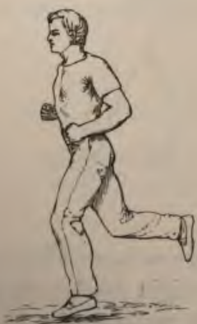
The action and position are the same in all rates of speed, except that as the pace increases the step is wider and the foot lifted higher on quitting the ground.

Fig. 2.



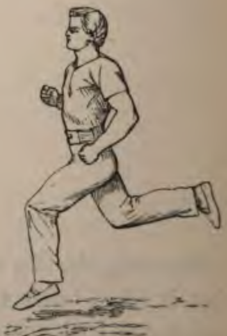
w time.

Fig. 3.



Half speed.

Fig. 4.



Speed.

LEAPING[a].

RUNNING has been characterized as a succession of leaps, because, as in the leap, both feet are at each step, for a space, removed from the ground; and for the same reason, and in a similar sense, the leap may be viewed as a modified step, because when preceded by the run, it forms but the terminating step in the course; the whole momentum acquired by the preliminary run being here employed in a final effort, either on the plane of the course itself, or on one more or less vertical to it.

The simplest form of leaping is the *standing* leap, which embraces a very extended series of exercises, all more or less valuable in preparing and strengthening the lower limbs for the more arduous modes of leaping, and for enabling the leaper to bring the upper limbs and the trunk itself to aid and assist in the effort. Of these the simple upward spring is the first; it is accomplished by the flexions and extensions of the trunk and lower limbs combined, the first act being to depress the trunk upon the thighs, pressing the hips to the rear and the knees prominently to the front, while by the same act the heels are raised from the ground, and the whole weight of the body is brought upon the fore part of the foot. At the same time, and in unison with this combined action, the upper limbs are brought down to their full extent. This is as it were the bending of the bow, the compression of the spring. The next act is to set it free, and this is done suddenly and at once. The powerful extensor muscles forming the greater portion of the thigh and lower part of the trunk, straighten by one act every joint, the feet spurn the ground, and the upper limbs are forcibly elevated.

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[a] See Appendix K.

This is the leap, and its height will be in relation to the force of the reaction from the preliminary depression.

The *forward*, *rearward*, and *sideward* leaps are but special modes of employing the same force, obtained by similar if not identical means. The action and position of the upper limbs in these special modes of leaping, however, are not solely for augmentation of force, but also for the preservation of the equilibrium of the body, and for the protection from injury when this has been lost.

There is scarcely any exercise in which men improve so rapidly and to so great an extent as in the various modes of leaping, and there is scarcely any exercise which so powerfully contributes to the development of the lower limbs. The action is precisely that which ture of the muscles themselves demands for their healthful growth and full development, namely, rapid contraction and expansion, with progressive and accumulative effort; while the power of concentrating the energies, of governing the action of the limbs, and of alighting on the spot and in the position desired, becomes, by practice of these various forms of leaping, completely under control.

The instructor must be careful to confine the learner to the simpler modes of leaping until he has acquired the power of making the limbs and trunk act harmoniously together, and of preserving the equilibrium of the body in every situation and position. When practising leaping *depth*, the initiatory practice should be at a very slight depth, gradually increasing, but never under any circumstances should it be increased, or its difficulty otherwise augmented, until the action and position is correct. In leaping *height* the learner must never be allowed to leap at a stiff barrier; it in no way tests the power of the leaper better than a fragile one, or affords greater advantages in the practice, and there is no merit in doing anything dangerous when there is no equivalent to be gained for the risk undergone. Rails should be attempted only by well-trained and experienced leapers, for a slip of the foot may and does often happen with the best leapers, and such a mishap ought never to entail serious injury. In leaping *width*, over a dry ditch, for practice, the ditch should be shallow, and the sand or saw-dust at the bottom should be frequently stirred or softened. It is part of the instructor's duty to see that the banks are firm and equal before his class begins its practice.

Every form of leap terminates in a position of body similar to that taken up in the preliminary movements of the first leap, namely, in the depression of the trunk upon the limbs, and the bending of the joints. This is done, strictly speaking, neither before nor after the descent is made, but, as it were in detail, as the different parts of the body successively arrive; the feet first, with the heels raised[a]; the lower limbs next, with the knees bent; the trunk following, pressing the hips to the rear; the whole *yielding* to the encounter with the resisting ground, and thus dispensing the shock or concussion.

The barrier for leaping *on* should be so constructed that it may be raised or lowered at pleasure, the top of it affording a firm resting-place for the feet. The barrier for leaping *over* should be formed of two standards about 6 feet high, fixed 5 or 6 feet apart. Between these a strong string, with a small flag in the centre, should be strained[b], looped round one of the posts, and lightly fastened to small iron pins, fixed a distance of one inch apart, up the back of the other. The heights from the floor should be marked in inches up each of the posts. The machine for leaping *depth* should be a small wooden platform supported on iron brackets made to clip over the rounds of a ladder, vertical or inclined, the platform being raised or lowered the distance apart of the rounds, as required, and the ladder giving means of access to it.

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[a] This, for learners and in non-competitive efforts, is preferable to k in common use.

FIRST SERIES .... *Standing.*
SECOND SERIES ...... *Running.*

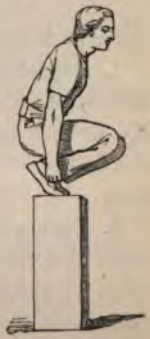
TO LEAP HEIGHT, IN TWO MOVEMENTS.

First Series.
Exercise 1.
COURSE I.

Position of attention, the toes a short distance from the barrier (according to its height).

1. Bring the arms upwards and forwards to their full extension above the head, the hands closed, again bring them downward to the full extension, at the same time bending the knees until they jut over and beyond the toes, raising the heels and bringing the weight of the body and downward pressure on the fore part of the foot; repeat this movement three times, and after the third depression, spring from the feet, rising above and alighting on the barrier, resting on the fore part of the foot, the knees bent low and jutting over and beyond the toes, the trunk of the body held low and compact, and bring the arms close in by the sides (Fig. 1).

Fig. 1.



2. Spring to the ground, preserving this position of body and extending the arms to the front.

TO LEAP HEIGHT, IN ONE MOVEMENT.

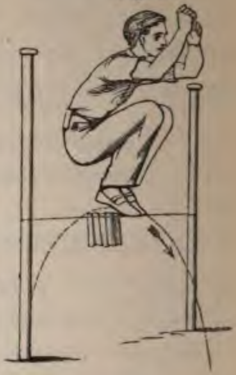
First Series.
Exercise 2.
COURSE I.

Position as in first exercise.

1. As in first exercise to the spring, except that the act of propulsion of the feet should be more directed to the front.

2. Clear the barrier (Fig. 2), and descend yielding.

Fig. 2.



TO LEAP HEIGHT, ONE MOVEMENT, THE LEFT SIDE LEADING.

First Series.
Exercise 3.
COURSE I.

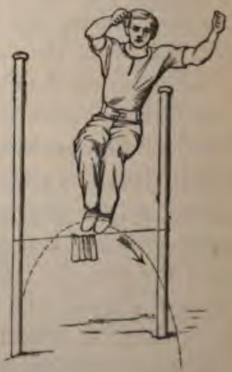
Position of attention, the barrier in profile on the left, the distance as in first exercise.

1. Repeat the preliminary movements, as in first exercise, giving the arms a lateral inclination (towards the barrier) on their elevation.

2. Spring from the feet in the same direction, clearing the barrier (Fig. 8), and descend yielding, (the barrier on the right).

This exercise to be repeated with the right side leading.

Fig. 3.



TO LEAP WIDTH.

First Series.
Exercise 4.
COURSE I.

Position of attention, the toes at the edge of the mark.

1. Bring the arms slowly upward and forward to the line of the shoulder, the hands closed (Fig. 4); bring them again downward and rearward to their full extension, at the same time depressing the lower limbs as in first exercise; repeat these movements three times.

2. Spring from the feet with the entire force of propulsion of the lower limbs and at the same instant throw the upper limbs to the front (Fig. 5); descend yielding, but let the entire sole of the foot meet the ground.

Fig. 4.

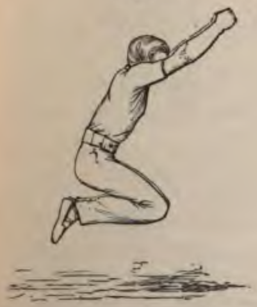
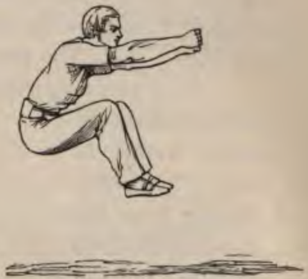


Fig. 5.



TO LEAP HEIGHT AND WIDTH COMBINED.

First Series.
Exercise 5.
COURSE III.

Position as in first exercise.

1. As in first exercise.

2. Spring from the feet, as in first exer-

cise, clear the barrier and the space beyond; descend yielding.

If the barrier be the first part of the obstacle, throw the arms and incline the body to the front, on clearing it; if the second part, bend the back inwards on clearing it and throw the hands to the extension of the arms, to the front upwards; descend yielding.

TO LEAP WIDTH, TO THE REAR.

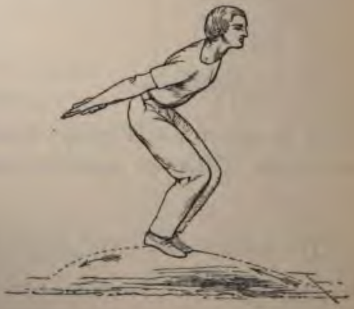
First Series.
Exercise 6.
COURSE II.

Position of attention, the heels at the edge of the mark.

1. The preliminary movements as in first exercise, except that the downward extension of the arms should be carried farther to the rear.

2. Spring from the feet, throwing the arms energetically to the rear (Fig. 6), the hands open, the palms upwards; descend yielding.

Fig. 6.



As soon as the feet eet the ground, bring [illegible] down by the [illegible] ms downwards and to the front.

TO LEAP WIDTH, SIDEWAYS.

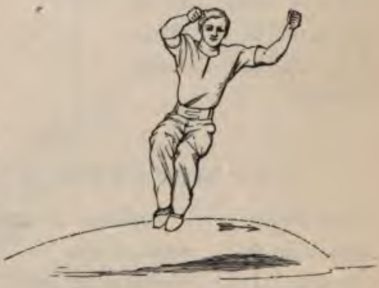
First Series.
Exercise 7.
COURSE II.

Position of attention, the mark in profile on the right, the edge of the right foot touching it.

1. Slightly bend the knees, letting them jut over, but not beyond, the toes; swing the arms upwards and across the body in front; on the return of the third swing or oscillation to the left, bend the knees steadily downward, the right lower than the left, raising the heels and resting on the fore part of the feet.

2. As the hands attain the culminating point, throw them rapidly and energetically to the right; at the same time spring from the feet with their entire concentrated force of propulsion (Fig. 7), and descend yielding.

Fig. 7.



This exercise to be repeated on the left.

TO LEAP DEPTH.

First Series.
Exercise 8.
COURSE II.

Position of attention, the toes at the edge of the platform or ditch.

1. Bend the knees until they jut over the toes, and above the space, raising the

heels, and resting on the fore part of the foot; during the depression of the lower limbs extend the arms by the sides, the hands lightly closed, the column of the body inclined to the front, but held close and compact (Fig. 8).

2. Press lightly from the feet, and spring to the front with sufficient force only to bring the back clear of the edge of the platform or ditch, extend the arms to the front (Fig. 9), and descend yielding.

Fig. 8.

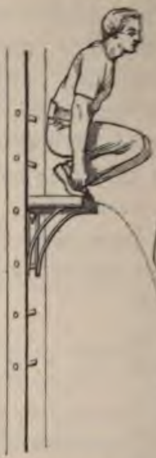
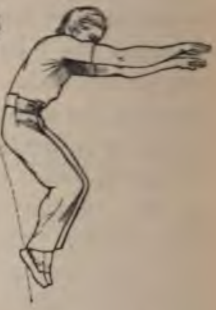


Fig. 9.



TO LEAP DEPTH, TO THE REAR.

First Series.
Exercise 9.
COURSE III.

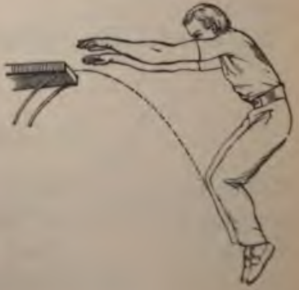
Position of attention, the heels at the edge of the platform or ditch.

1. The preliminary movements as in sixth exercise.

2. Spring lightly to the rear, throwing the hands forwards to the full extension the arms (Fig. 10), and nd yielding.

he equilibrium be lost

Fig. 10.



and the body fall to the front, extend the arms as in preceding exercise; if to the rear, as in sixth exercise, Fig. 6.

TO LEAP WIDTH AND DEPTH COMBINED, TO THE FRONT.

First Series.
Exercise 10.
COURSE III.

Position of attention, the toes at the edge of the platform or ditch.

1. (Look steadily at the spot desired to be reached.)

The preliminary movements as in eighth exercise.

2. Spring from the feet, and at the same instant throw the hands upwards and forwards (Fig. 11), clear the space, and descend *yielding* (Fig. 12).

Fig. 11.

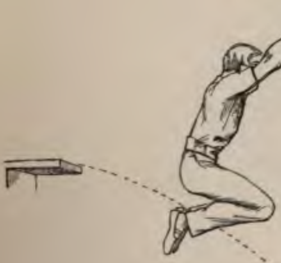
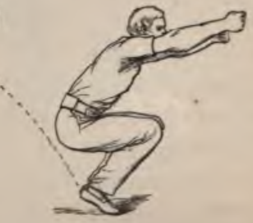


Fig. 12.



TO LEAP WIDTH AND DEPTH COMBINED, TO THE REAR.

First Series. Position as in ninth exercise.

Exercise 11. 1. (Glance to the rear and determine on

COURSE IV. the spot to be reached in the leap.) The preliminary movements as in sixth exercise.

2. Spring from the feet, at the same time throw the hands to the rear, open, with the palms downwards, and descend yielding.

A SECOND METHOD.

First Series. Position as in ninth exercise.

Exercise 12. 1. Stoop down and grasp the ledge of the

COURSE IV. platform with both hands, the fingers and thumbs meeting, the fingers above (Fig. 13); if at the edge of a ditch, the fingers and thumbs together, the palm on its surface.

2. Spring from the feet, shooting them out to the rear, and at the same instant press strongly
n the hands (Fig.
tain them in
t, the palms
d descend yielding.

Fig. 13.

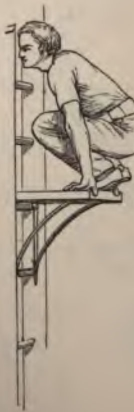
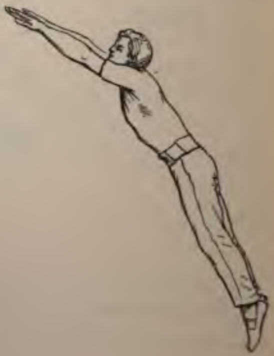


Fig. 14.



TO LEAP WIDTH AND DEPTH COMBINED, SIDEWAYS.

First Series.
Exercise 13.
COURSE IV.

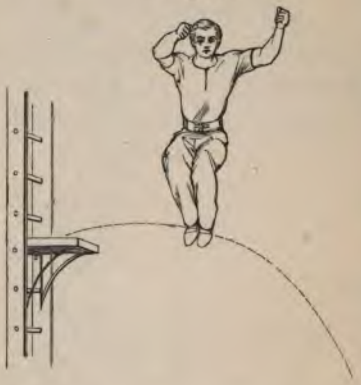
Position of attention, the ditch or front edge of platform in profile on the right.

1. The preliminary movements as in seventh exercise.

2. Spring from the feet, throwing the hands to the left front (Fig. 15), descend yielding.

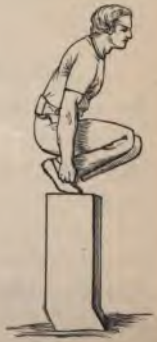
This exercise to be repeated, the right side leading.

Fig. 15.



TO LEAP HEIGHT, TWO MOVEMENTS.

Fig. 16.



Second Series.
Exercise 14.
COURSE I.

Position of attention, twenty or thirty paces from the barrier.

1. Begin the preliminary run, with short, well-measured steps, quickening the pace on the advance, and when within a few feet of the barrier (according to its height), spring from the foot making the last step, bring both knees close up in front, the hands being elevated at the instant of the spring as in first

exercise, and alight upon the barrier, bringing the hands instantly down by the sides (Fig. 16).

2. Descend as in first exercise.

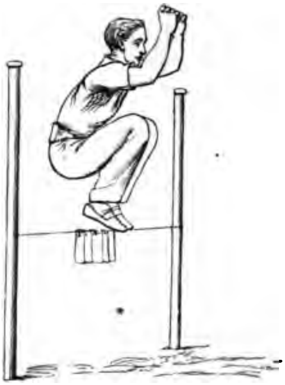
TO LEAP HEIGHT, ONE MOVEMENT.

Second Series.
Exercise 15.
COURSE I.

Position as in fourteenth exercise.

1. As in preceding exercise to the spring, clear the barrier (Fig. 17), and descend yielding.

Fig. 17.



TO LEAP HEIGHT, ONE MOVEMENT, THE LEFT SIDE LEADING.

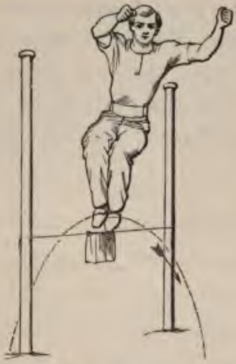
Second Series.
Exercise 16.
COURSE I.

Position as in fourteenth exercise.

1. The preliminary run as in fourteenth exercise; swerve slightly to the left in the

last few steps, inclining the left shoulder forward, spring from the left foot, clear the barrier (Fig. 18), the left foot leading to the ground, and descend yielding, the barrier on the right.

Fig. 18.



This exercise to be repeated with the right side leading.

TO LEAP WIDTH.

Second Series.
Exercise 17.
Course I.

Position as in fourteenth exercise.

1. The preliminary run as in fourteenth exercise, spring from the foot making the last step, the whole act of propulsion of the spring and the momentum acquired in the run being directed to the front, the lower limbs closely bent up, the trunk of the body compact and firm, the hands closed and thrown to the front, as in Fig. 4; descend yielding, resting on the entire sole of the foot.

TO LEAP HEIGHT AND WIDTH COMBINED.

Second Series.
Exercise 18.
COURSE III.

Position as in fourteenth exercise.

1. The preliminary run as in fourteenth exercise; the spring as in fourteenth exercise; the effort should be to divide the momentum of the run, and that given by the propulsion of the spring, so that the obstacle in both aspects, height and width, shall be cleared; descend yielding.

◆

THE LEAPING ROPE.

THE exercises with the leaping rope, and also those with the leaping pole, differ in certain features from all other modes of leaping; they employ a machine to aid the leaper in clearing the barrier, and they give employment to both the upper and the lower limbs, thus forming the connecting-link between leaping and vaulting. The practice of these exercises is very good in an elementary sense, giving much action in a beneficial form to the trunk as well as to the limbs.

This machine is a strong rope suspended from a tie-beam or other point of attachment, over the centre of the string and posts already described for leaping height. It should reach within four feet of the ground.

SINGLE SERIES.

TO LEAP HEIGHT.

Single Series.
Exercise 1.
COURSE I.

Position of attention in front of the barrier.

1. Raise both hands to the reach and grasp the rope, passing the end of it over the shoulder (Fig. 1); spring from the feet (slightly to the rear), bringing the lower limbs straight up in front of the face, letting the *head* and shoulders incline to the rear

(Fig. 2); clear the barrier, bending the back inwards, and shooting the feet to the front; the legs straight and together (Fig. 3); bring the head and shoulders to the front, quit the grasp of the hands, and descend yielding.

Fig. 3.

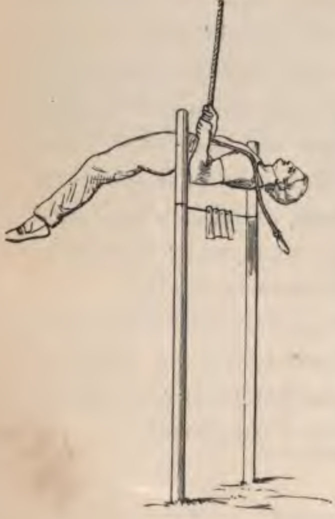


Fig. 2.

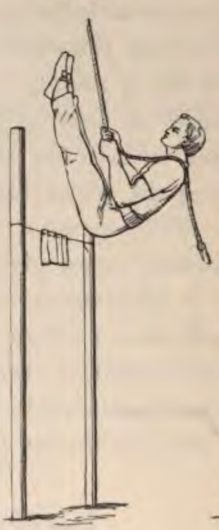
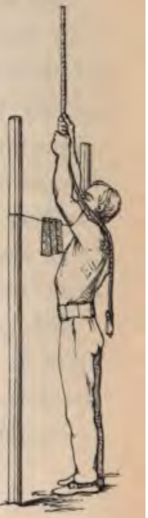


Fig. 1.



HAND OVER HAND.

Single Series.
Exercise 2.
COURSE II.

Position as in first exercise.

Raise the right hand to the reach, spring from the feet and bring the lower limbs up in front as in first exercise: during their rise, pass the left hand over the right, and again the right over the left, clear the barrier as in first exercise, and descend yielding.

This method to be used when the barrier is too high to *be cleared as* directed in first exercise.

TO LEAP WIDTH.

Single Series.
Exercise 3.
COURSE I.

Grasp the end of the rope with the left hand and step to the rear until the arm is at the reach, make a half-face to the right, and take a short step to the front with the left foot, the knees slightly bent, the right arm extended by the side, the palm open, and to the front, the fingers pointed to the ground (Fig. 4).

1. Lift the left foot from the ground, throwing the weight of the body to the rear, press strongly from the right foot, spring from the ground backwards, rapidly placing the feet together and swinging them to their farthest rearward point, the legs straight and together, the toes pointed, at the same time turning the body to the front, the arms bent at the half-reach, the head bent back (Fig. 5); begin the forward swing, bringing the lower limbs to the front and letting them rise

Fig. 4.

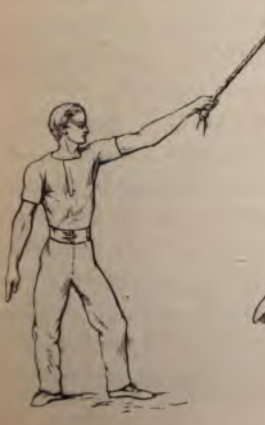
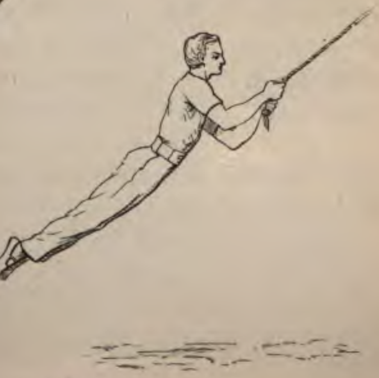


Fig. 5.



as high as the hands (Fig. 6); when approaching the terminating point of the swing, lower the feet, quit the grasp of the hands, incline the head and shoulders to the front (Fig. 7), and descend yielding.

Fig. 6.

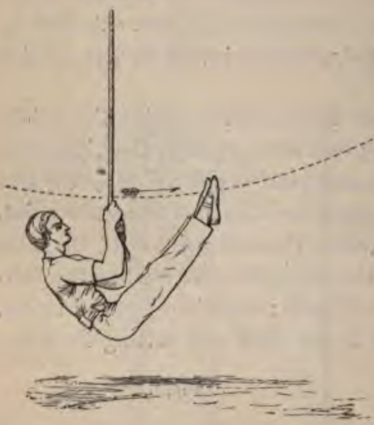
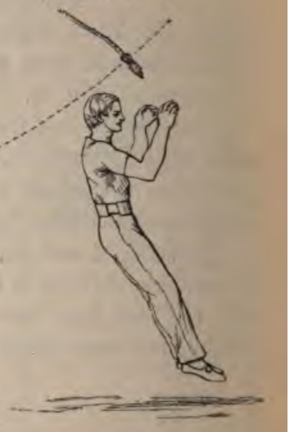


Fig. 7.



THE DOUBLE SWING.

Single Series.
Exercise 4.
COURSE III.

Position as in third exercise.

1. As in third exercise to the terminating point of the forward swing; instead of quitting the grasp, advance the right shoulder, wheel round, bringing the back upwards, throw the lower limbs high and free to the rear (thereby greatly increasing the momentum), begin the return swing, bringing the feet to the front as in the first swing; at its culminating point, dvance the left shoulder, wheel round to the front, lower the quit the grasp, inclining the body forward, and descend ng.

THE LEAPING POLE.

The exercises with the leaping pole may almost be viewed as belonging to recreative rather than systematized exercise, being essentially for the open air, and among the few which may be left for free practice, after the learner has acquired a knowledge of the action and position of the different exercises. They are valuable as giving precision to the eye and hand, the power of calculating distance, and of rapidly determining the moment for executing a complicated movement, with the presence of mind to execute it, in addition to the physical exercise of the run and leap, the balance and descent.

The leaping pole should be of ash, about $1\frac{3}{4}$ inches in diameter, and from eight feet to ten feet long, perfectly smooth, and shod with iron at the butt or lower end.

FIRST SERIES ... *Standing.*
SECOND SERIES... *Running.*

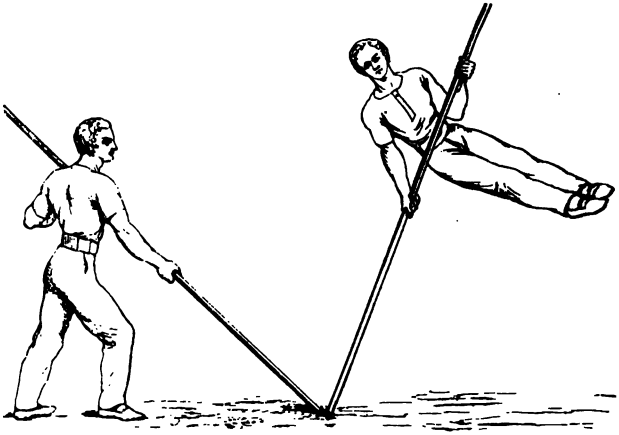
TO LEAP WIDTH.

First Series.
Exercise 1.
COURSE I.

Position of attention, one pace from the mark, with the pole at the balance, i.e. held horizontally across the body with the arms bent, the butt of the pole held slanting to the front, the hands at the distance, the right hand to the front, the palms of the hands upwards, the fingers and thumbs meeting; or with the palm of the right hand downwards.

1. Advance the right foot to the edge of the mark, advance the butt of the pole to the utmost reach, and fix it on the ground without displacing the feet or changing the grasp of the hands (Fig. 1).

Fig. 1. Fig. 2.



2. Spring from the feet, and pass by the left of the pole, the whole body with the lower limbs straight and extended in one line when passing the pole (Fig. 2); descend yielding, and as the feet meet the ground raise the pole to the balance.

This exercise to be repeated, advancing the left foot to the mark, the left hand to the front, and passing by the right *of the pole.*

TO LEAP HEIGHT.

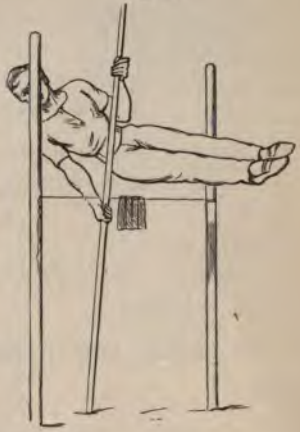
First Series.
Exercise 2.
COURSE II.

Position as in first exercise, a short distance from the barrier, (in proportion to its height).

1. As in first exercise, advancing the butt of the pole to within a few feet of the barrier, (according to its height).

2. Spring from the feet and clear the barrier, passing by the left of the pole, the body in position as in first exercise when clearing the barrier (Fig. 3); after clearing the barrier, quit the grasp of the pole, throwing it back to the starting-point, and descend yielding, facing the barrier.

Fig. 3.



This exercise to be repeated, advancing the left foot, the left hand to the front, and passing by the right of the pole.

TO LEAP DEPTH.

First Series.
Exercise 3.
COURSE III.

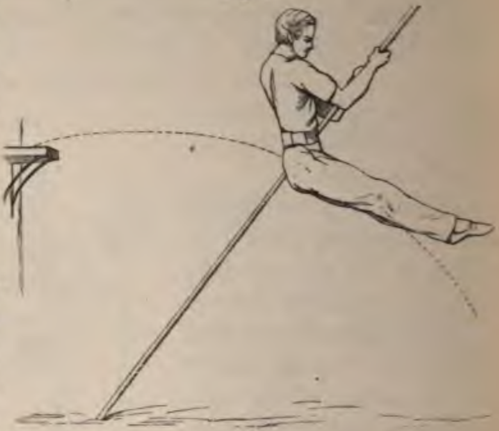
Position as in first exercise, the toes at the edge of the platform or ditch.

1. Advance the pole and firmly plant the butt on the ground.

2. Press lightly from the feet, quit the platform or ground,

passing by the right of the pole, the trunk of the body in the line of the pole when passing it, the lower limbs at a right angle with it, the toes pointed to the front; continue the descent (Fig. 4), and when nearing the ground quit the grasp of the pole, throw it slightly to the left, and descend yielding.

Fig. 4.



This exercise to be repeated, passing by the left of the pole.

TO LEAP WIDTH.

Second Series.
Exercise 4.
COURSE II.

Position of attention twenty or thirty paces from the edge of the ditch, the pole at the balance, the right hand to the front.

1. Begin the advance with a short, light, and well-measured step, fixing the eye on the ditch and regarding it steadily, quicken the pace when nearing it, select the spot and plant the pole without halt, springing by the

position of body and lower limbs as in first exercise.

ding, bringing the pole to the balance.

This exercise to be repeated, advancing the left foot, passing by the right of the pole, the left hand to the front.

TO LEAP HEIGHT.

Second Series.
Exercise 5.
COURSE III.

Position as in fourth exercise.

1. As in fourth exercise to the spring; clear the barrier as in first exercise, quit the grasp of the pole at the commencement of the descent, letting it fall to the rear without touching the barrier, and descend yielding, facing the barrier.

This exercise to be repeated, advancing the left foot, the left hand to the front, and passing by the right of the pole.

THE HORIZONTAL BEAM.

THE exercises on this machine follow in natural order the preceding simple exercises of progression. They do but carry such exercises one step farther, by increasing the difficulties of their execution.

In reality the physical difficulty of walking on a beam raised a foot above the floor is no greater than that of walking on one of the planks of the floor itself, provided the former is as firm as the latter, and its surface as level and secure to the foot; and to walk on a beam a hundred feet above the ground is physically no more difficult than either. Therefore the difficulty to be overcome in walking along an elevated beam presenting a surface sufficiently broad to admit of the complete placing of the foot, and free from all oscillation and vibration, is entirely mental, arising, it may be, from many and conflicting causes, in which actual fear has no share. It is most important that both instructor and learner should be aware of this, because from the latter it will remove an imaginary difficulty, while the former will, from it, see the propriety and necessity of patience and forbearance with the defects of beginners in the simplest exercises on this essentially rudimentary machine. The preservation of the equili- m is the very essence of these exercises, and the acquirement of the power of maintaining it under difficulties is their avowed purpose and object.

The first series, *sitting*, is of the simplest description, and, as shown in the note introductory to the section, its exercises are executed in the position in which the equilibrium is maintained with the least effort.

The second series, *walking upright*, is of much greater difficulty than the first, but is still composed of exercises of a simple character.

Other exercises, such as the second series on the horizontal bar, and the second and third series on the slanting pole, may also be performed on the beam, but they properly belong to the machines in connexion with which they are described.

The instructor should walk by the side of the learner, to explain the action and position of the different exercises, and to give assistance when required.

This machine is a round wooden beam, not less than 25 feet long, 9 or 10 inches in diameter at one end, and 6 or 7 inches at the other, made to move up and down between standards, and supported on iron pins running through them.

FIRST SERIES .... *Sitting.*
SECOND SERIES .. *Upright.*
THIRD SERIES ... *Changes of position.*

THE FRONT MARCH.

(THE BEAM LOW.)

First Series.
Exercise 1.
COURSE I.

Position of attention facing the beam.

1. Place the hands on the beam at the distance, the thumbs and fingers straight and together, and pointed to the front; incline the head and shoulders to the front, lean strongly upon the hands, pass the right leg over by the rear, and come to the seat astride of the beam, placing the hands upon the thighs (Fig. 1), the head erect, the breast advanced, the column of the body upright, the legs pendent on either side of the beam.

Fig. 1.

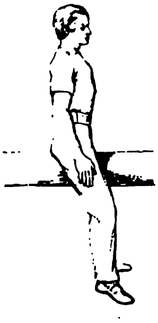


Fig. 2.

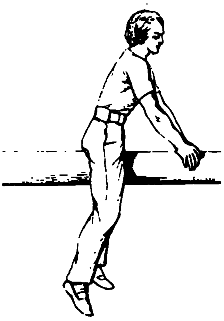
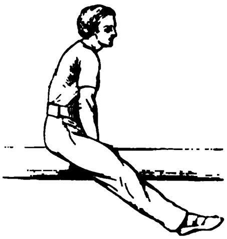


Fig. 3.



2. Incline the head and trunk to the front, advance the hands (Fig. 2), rest upon them, lift the body from the beam, and bring it up again to the hands, extending the lower limbs to the front, the toes pointed to the front (Fig. 3). Repeat.

In descending, pass the right leg by the rear over to the left, press lightly from the hands and descend yielding.

THE REAR MARCH.

First Series.
Exercise 2.
COURSE I.

Position as in first exercise.

1. As in first exercise, except that the left leg is passed by the rear over the beam.

2. Rest on the hands, elevate the feet in front nearly as high as the beam (Fig. 3), throw them to the rear to the reach of the arms, resting on the inner side of the thighs, the body lying inclined to the front (Fig. 2), bring both hands up to the thighs. Repeat.

Descend as in first exercise, passing the left leg by the rear over the beam.

THE SIDE MARCH.

First Series.
Exercise 3.
COURSE I.

Position as in first exercise.

1. Come to the seat astride of the beam, as in first exercise; pass the left hand to the rear, pass the right leg by the front over to the left side (Fig. 4).

2. *Advance the left* hand along the beam to the reach,

inclining the body in the same direction (Fig. 5), lift the body up close to the left hand, preserving the balance, bring the right hand up to the body. Repeat.

In descending, press lightly from the hands, shoot out the lower limbs to the front, and descent yielding.

Fig. 4.

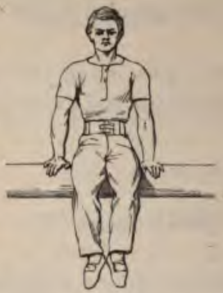
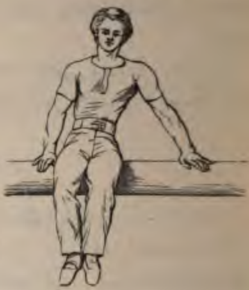


Fig 5.



THE FRONT MARCH, HANDS ONLY.

First Series.
Exercise 4.
COURSE II.

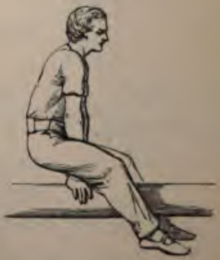
Position as in first exercise.

1. As in first exercise.

2. Rest upon the hands, rising from the seat, the lower limbs pendent, the toes pointed downwards (Fig. 6), incline the body to the right front, advance the left hand, incline the body left front, advance the right hand beyond the left. Repeat.

Descend as in first exercise.

Fig. 6.



THE FRONT MARCH, BOTH HANDS AT ONCE.

First Series. Position as in first exercise.
Exercise 5. 1. As in first exercise.
COURSE II. 2. Rest upon the hands as in preceding exercise, Fig. 6, spring to the front with both hands, inclining the body to the front, the lower limbs compact, but free. Repeat.

Descend as in first exercise.

THE REAR MARCH, BOTH HANDS AT ONCE.

First Series. Position as in first exercise.
Exercise 6. 1. As in second exercise.
COURSE II. 2. Rest upon the hands, spring to the rear with both hands, inclining the body slightly to the front. Repeat.

Descend as in second exercise.

THE FRONT MARCH, THE LEFT FOOT LEADING.

(THE BEAM HIGH.)

Second Series. Position as in first exercise.
Exercise 7. 1. Raise the hands and place them on
COURSE I. the beam as in first exercise, bend the knees, and on the return extension, spring from the ground, press strongly with the hands, extend the arms, and raise the trunk of the body above the beam, the legs straight and together, the feet together, and pointed to the ground (Fig. 7); pass the right leg over by the rear, and come to the seat astride of the beam, as in first exercise,

Fig. 1; replace the hands, extend the lower limbs to the front (Fig. 8), incline the body forward, rest on the hands, sweep the feet by the rear, bending the legs, and place the toes on the beam, close behind the hands (Fig. 9); straighten the legs, rising from the rest on the palms to the tips of the fingers, rest entirely on the feet, and rise upright.

Fig. 7.

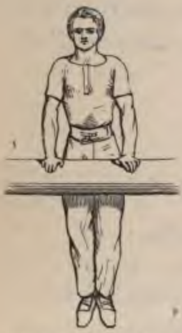


Fig. 8.

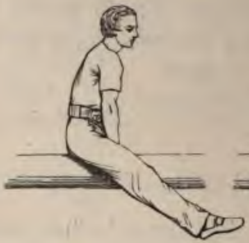


Fig. 9.

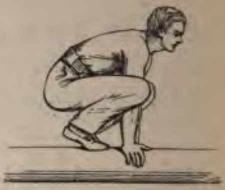


Fig. 10.

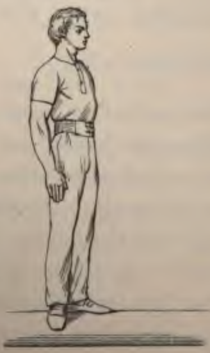
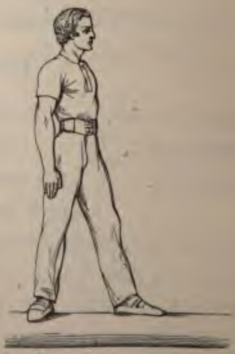


Fig. 11.



2. Make a half-face to the right, bringing the heel of the left foot into the hollow of the right, the left foot pointed straight along the beam, the right directly across

the beam (Fig. 10), the rest of the body in the position of attention.

3. Advance the left foot a pace along the beam (Fig. 11), incline the body to the front over the advanced foot, and bring up the hollow of the right foot again to the heel of the left, the upper part of the body and the arms remaining throughout in the position of attention. Repeat.

On descending come to the front, bend the knees, keeping the feet on the beam, advance the hands, the palm downwards, the fingers to the front, place them on the beam in front of the feet, as in the ascent (Fig. 9), rest on the hands, lift and separate the feet, and sink to the seat on the beam; complete the descent as in first exercise.

This exercise to be repeated with the right foot leading.

THE FRONT MARCH, RIGHT AND LEFT.

Second Series. Position as in first exercise.

Exercise 8. 1. As in seventh exercise.

COURSE I. 2. Advance the left foot a pace along the beam, the toes pointed slightly outwards, incline the body to the front over the advanced foot, bring the right foot to the front and place it on the beam in advance of the left, the body as in preceding exercise. Repeat.

Descend as in seventh exercise.

THE SIDE MARCH.

Second Series. Position as in first exercise.

Exercise 9. 1. As in seventh exercise.

COURSE II. 2. Face to the right, bringing both feet across the beam, and resting on the hollow of the foot (Fig. 12); advance the left foot a short step along the beam, incline the body to the left over the foot, bring up the right foot close to the left. Repeat. The trunk of the body and the arms remaining in the position of attention throughout.

Face to the front, and descend as in seventh exercise.

This exercise to be repeated with the right foot leading.

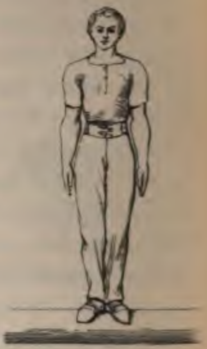


Fig. 12.

THE REAR MARCH, THE LEFT FOOT LEADING.

Second Series.
Exercise 10.
COURSE II.

Position as in first exercise.

1. As in seventh exercise, to the upright position on the beam, except that the left leg is passed over the beam, bringing the back to the line of march.

2. Make a half-face to the left, bringing the heel of the right foot into the hollow of the left, the right foot pointed straight along the beam, the left directly across the beam, the rest of the body in position.

3. Rest on the right foot, pass the left a step to the rear, rest on the left foot, and bring the right foot again up to the left. Repeat.

s exercise to be repeated with the right foot leading.

THE REAR MARCH, RIGHT AND LEFT.

Second Series. Position as in first exercise.

Exercise 11. 1. As in preceding exercise.

COURSE II. 2. Rest on the right foot, pass the left a step to the rear, the toes first meeting the beam, the heel following; rest on the left foot and pass the right a step to the rear. Repeat.

TO MARCH TO THE FRONT, ONE FOOT ON THE BEAM.

Second Series. Position as in first exercise.

Exercise 12. 1. As in seventh exercise.

COURSE III. 2. Bend the knees until they jut over the toes, inclining the body forward, and resting on the toes, the arms remaining extended by the sides, remove the left foot from the beam, let the leg fall straight by the side of the beam, slightly to the rear, the toes pointed to the ground (Fig. 13); elevate the left leg to the front by the side of the beam, retaining it straight throughout, and place the heel upon the beam, a full step in advance of the right (Fig. 14), incline the body forward, bringing the toes of the left foot upon the beam, bend the left knee, the heel rising as the body advances, let the right leg gradually straighten until the instep rests upon the beam (Fig. 15), incline the head and shoulders to the front, let the right leg fall straight by the side of the beam and complete the step as with the left. Repeat.

Fig. 13.

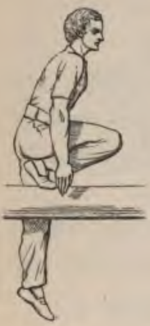


Fig. 14.

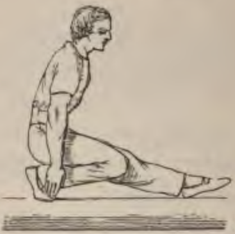
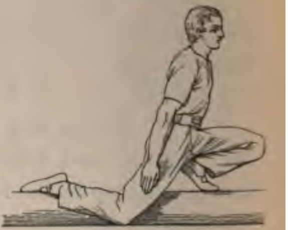


Fig. 15.



This exercise to be repeated backwards, reversing the movements.

TO CHANGE FRONT.

Third Series.
Exercise 13.
COURSE III.

From the front march sitting, Exercise 1, First Series.
From the rear march sitting, Exercise 2, First Series.
From the front march, hands only, Exercise 4, First Series.
From the front march, both hands at once, Exercise 5, First Series.
From the rear march, both hands at once, Exercise 6, First Series.

nplete the step, placing the hands on the thighs.
he right leg over the beam by the front, placing left; change the seat, pass the left over the

beam, turning to the left, adjust the seat, coming square to the front.

A SECOND METHOD.

Third Series.
Exercise 14.
COURSE III.

1. Complete the step, placing the hands upon the thighs.

2. Pass the right leg over the beam by the rear, at the same time changing the position of the left hand, throw the left leg over the beam, at the same time bringing the right hand opposite the left, and come square to the front.

TO CHANGE POSITION.

Third Series.
Exercise 15.
COURSE III.

From the front march, left foot leading, Exercise 7, Second Series.
From the front march, right and left, Exercise 8, Second Series.
From the rear march, left foot leading, Exercise 10, Second Series.
From the rear march, right and left, Exercise 11, Second Series.

1. Complete the step.

2. Descend to the beam as in seventh exercise, placing the hands upon the thighs.

3. Replace the hands upon the beam, extend the lower limbs to the front as in Fig. 8, incline the body to the front, rest on the hands, and re-ascend as in seventh exercise, Fig. 9.

TO REST ON THE BEAM.

Third Series.
Exercise 16.
COURSE III.

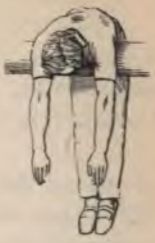
From the same exercises (Nos. 7, 8, 10, 11, Second Series).

1. Complete the step.

2. Descend to the beam as in seventh exercise.

3. Incline to the front, pass the right leg over the beam by the rear, turning the body to the right, lean forward, rest upon the waist on the beam, let the arms fall pendent over the beam (Fig. 16), the legs together and straight, the toes pointed to the ground.

Fig. 16.



4. Reverse the order of the movements on rising from the rest.

TO PASS UPON THE BEAM.

(TWO MEN MEETING.)

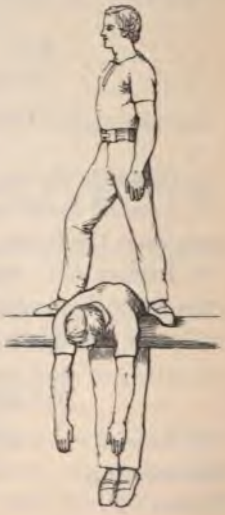
Third Series.
Exercise 17.
COURSE III.

From exercises (Nos. 7, 8, Second Series).

1. Complete the step.

2. Let the first man come to the rest across the beam, as in preceding exercise, and the second then resume the march, passing the foot clearly over and beyond the trunk of the first man (Fig. 17), who will then rise as in preceding exercise and resume the march.

Fig. 17.



A SECOND METHOD.

Third Series.
Exercise 18.
COURSE III.

From the same exercises (Nos. 7, 8, Second Series).

1. Let each man advance the right foot, place them together, the toes slightly turned outwards, then let each advance the right hand, and clasp the outside of the other's left arm near the shoulder, advance the left hand, and with the palm press against the other's right side, under the arm (Fig 18); let each slowly incline to the front, resting on the right foot; remove the left foot from the beam, swing the leg round to the front (the body turning), and place it on the beam a short distance in advance of the right, making a complete turn with the body during the movement, and coming face to face (Fig. 19), giving and receiving support; let each lightly remove the hands, resume the front, and complete the march.

Fig. 18.

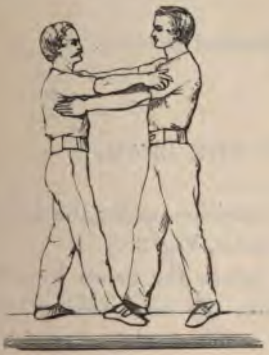
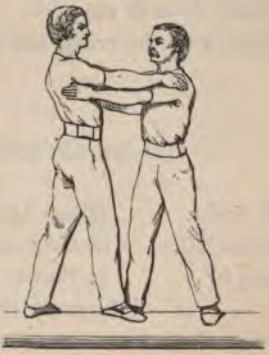


Fig. 19.



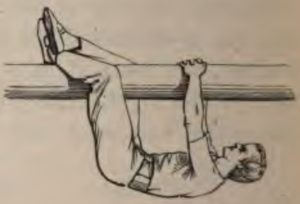
TO DESCEND FROM THE BEAM.

Third Series.
Exercise 19.
COURSE III.

(From the seat astride of the beam, when the beam is raised.)

1. Lean forward until the breast touches the beam, passing both hands under the beam and taking the intergrasp beneath, pass both legs around the beam and cross the ankles, the right in front of the left; slowly incline to the right, and let the body pass under the beam, the hands and feet ascending to the surface, as the trunk descends beneath it (Fig. 20), untwine the feet, and lower them to the vertical line, quit the grasp, and descend yielding.

Fig. 20.



TO RE-ASCEND THE BEAM.

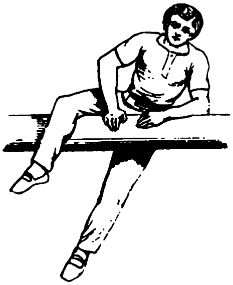
Third Series.
Exercise 20.
COURSE IV.

(From the position, under the beam, of preceding exercise, Fig. 20.)

1. Slowly detach the hands from their intergrasp above the beam, taking instead a strong clasp with the open palm, slowly relinquish the sp of the left, and rapidly pass it under the beam by nt to the right side, at the same time swinging the under the beam with sufficient force to raise

the head and shoulders above the beam on the same side; hold strongly by the clasp of the hands, pass the right leg over the beam until the thigh is on its surface, bring the left arm on the surface of the beam (Fig. 21), elevate the trunk, and rise, seated on the beam.

Fig. 21.



All the exercises on the underside of the slanting pole may be executed on the beam, advancing the whole hand as far as the wrist, on its surface.

Also, the exercises in rising above the horizontal bar, the open clasp of the palm being substituted for the grasp of the closed hand.

THE VAULTING BAR.

Nothing could more distinctly show the nature and importance of progressive exercise than the apparatus of this section, each succeeding machine presenting in a more difficult form the exercises of its predecessor. Thus, as running naturally followed walking, and leaping followed the race at speed, so the modified leap with the rope and pole is introductory to vaulting, where, from playing a secondary part, the upper limbs pass to one of equal importance with the lower ones.

The bar, of which the girth will admit of its being grasped by the hand, and which can be elevated and depressed to suit the capacity of the learner, is the most simple form of the vaulting machine; and as will be seen by the description in the text of the action and position preparatory to the rise, it is similar to the first standing leap; with this distinguishing difference, that the hands grasp the barrier, and the upper limbs take up the effort after the lower limbs have completed the spring.

In the first form of vaulting the body is carried over the barrier in a horizontal line, being from head to foot, when above the bar, in the exact line of the bar itself. the second form, the lower half of the body is lifted ction of the loins, elongated and elevated vertically above the hands, and thrown straight to the front. A third form which unites in some degree both of these, is when the body from the vertical position above the bar is thrown to the right or left front according to the side on which the vault is to be made. All these forms of vaulting require special care on the part of the instructor, who should impress upon the learner at every opportunity the necessity for keeping the lower limbs in position and close together.

The position of the instructor should be in front of the learner, with one hand grasping the wrist nearest to him, and the other held in readiness to give assistance if required.

The vaulting bar should be of ash (specially selected for its straightness and freedom from knots) turned perfectly round, 2¼ inches in diameter, except at the ends, where square shoulders or 'tenons' should be formed, to run up and down the grooves or space between the standards. The standards should be 7 feet apart and 7 feet high, formed in two pieces with a space of 1¾ inches between them to receive the shoulders at the ends of the bar, and pierced with holes 3 inches apart, fitted with moveable wrought-iron pins for the bar to rest on. Where it is desired to have the bar of less diameter, it should be bored throughout its length, and a steel rod or 'core,' specially tempered, inserted, terminating at each end in a brass cap, fitting the shoulder of the bar.

SINGLE SERIES.

TO VAULT OVER THE BAR IN THREE MOVEMENTS.

Single Series.
Exercise 1.
COURSE I.

Position of attention, facing the bar, close to it.

1. Raise the hands and grasp the bar; the hands at the distance, the fingers and thumbs meeting; lift the feet from the ground, press strongly with the hands, rising to the full extension of the arms and inclining the body slightly forward during its ascent; the head erect, the column of the body upright, the legs straight and

Fig. 1.

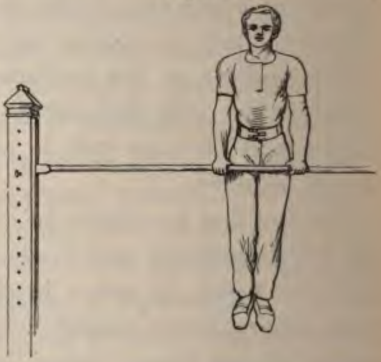


Fig. 2.

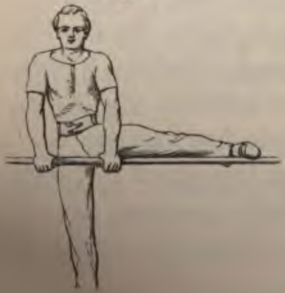
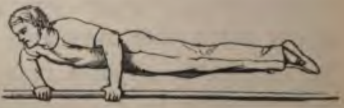


Fig. 3.



together, the feet together, the toes pointed to the ground (Fig. 1).

2. Raise the right leg, retaining its extension, and place the foot upon the bar, the hollow of the foot resting on it (Fig. 2).

3. Raise the left leg, and bring the left foot up to the right, clear the bar, the whole column of the body and the lower limbs in one horizontal line over it, the arms bent, the chest turned towards the bar (Fig. 3), quit the grasp, and descend yielding, facing the bar opposite the point grasped by the hands.

This exercise to be repeated on the left.

TO VAULT OVER THE BAR IN TWO MOVEMENTS.

Single Series. Position as in first exercise.
Exercise 2. 1. As in first exercise.
COURSE II. 2. Lean forward across the bar, press the lower limbs to the front under the bar, and as they return to the rear throw them to the right, clear the bar, as in preceding exercise (Fig. 3), quit the grasp of the hands, and descend yielding, facing the bar.

This exercise to be repeated on the left.

TO VAULT OVER THE BAR IN ONE MOVEMENT.

Single Series. Position as in first exercise.
Exercise 3. 1. Raise both hands and grasp the bar
COURSE II. as in first exercise, press from both hands and feet simultaneously, throw both feet with the lower limbs in position to the right, clear the bar,

the trunk and lower limbs in the position of first exercise (Fig. 3), quit the grasp, and descend yielding.

During this exercise the body should make a complete turn, the feet describing a semicircle diagonally, the chest at each point of the ascent and descent being continually turned towards the bar, the position of the body on the completion of the descent being as distinctly facing the bar as it was preparatory to the ascent.

This exercise to be repeated on the left.

TO VAULT OVER THE BAR BY THE BACK LIFT.

Single Series.
Exercise 4.
Course III.

Position as in first exercise.

1. Raise both hands and grasp the bar, as in first exercise; press strongly with the hands and feet simultaneously, and throw the body over the bar in a straight line vertically above the head, the arms bending during its ascent, the elbows held close in by the sides, the head and shoulders inclined to the front, the column of the body and the lower limbs with the pointed upward tical line when bar (Fig. 4);

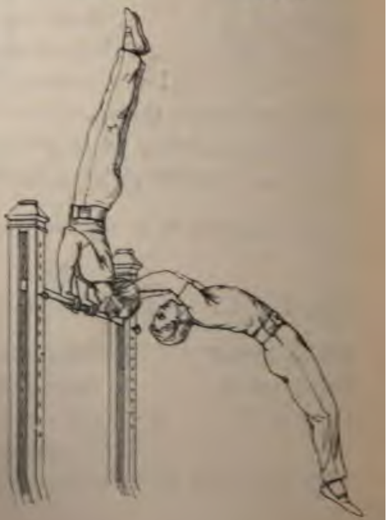


Fig. 4. Fig. 5.

from this point throw the feet to the front, bending the back inwards, and raising the head as the feet approach the ground, quit the grasp (Fig. 5), and descend yielding, the back to the bar.

TO VAULT OVER THE BAR BY THE BACK LIFT, IN TWO MOVEMENTS.

Single Series.
Exercise 5.
COURSE III.

Position as in first exercise.

1. As in first exercise (Fig. 1).

2. Press the lower limbs to the front, as in second exercise, and as they return to the rear, throw them straight above the head as in fourth exercise (Fig. 4), the arms bending during the ascent ; clear the bar and descend as in fourth exercise.

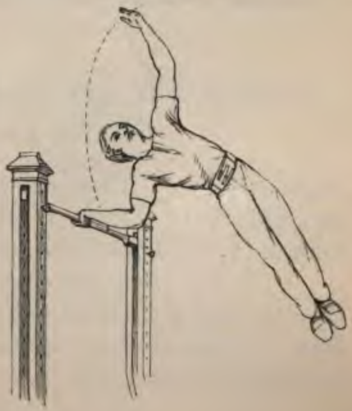
TO VAULT THE BAR OVER ONE HAND.

Single Series.
Exercise 6.
COURSE IV.

Position as in first exercise.

1. As in fourth exercise, but during the elevation of the lower limbs above the bar, instead of retaining the body between the hands, incline it over the right arm, the trunk and lower limbs turning towards the right ; complete the elevation of the lower limbs until they rise straight above the bar over the grasp of the right hand, quit the

Fig. 6.



grasp of the left, and pass it above the head; let the feet descend (Fig. 6), the right side next the bar, quit the grasp of the right hand, and descend yielding.

This exercise to be repeated over the left hand.

TO VAULT THE BAR WITH THE HANDS ONLY.

Single Series.
Exercise 7.
COURSE IV.

Position as in first exercise.

1. Spring up and grasp the bar with both hands, as in first exercise, and in lifting the feet from the ground press them to the front under the bar; on their return oscillation, rapidly bend the arms, until the breast rises above the bar, press strongly with the hands, continue the upward movement of the body, and at the same time throw the lower limbs in position to the right, clear the bar, and descend yielding.

This exercise to be repeated on the left.

TO VAULT THE BAR WITH THE HANDS ONLY, BY THE BACK LIFT.

Single Series.
Exercise 8.
COURSE IV.

Position as in first exercise.

1. As in preceding exercise until the breast rises above the bar, at this point press the elbows close in by the sides, in-
ad and shoulders to the front, elevate the lower
v above the head as in fourth exercise (Fig. 4),
ding (Fig. 5).

TO VAULT THE BAR WITH THE HANDS ONLY, OVER ONE HAND.

Single Series.
Exercise 9.
COURSE IV.

Position as in first exercise.

1. As in preceding exercise, but during the elevation of the lower limbs above the bar, incline the body over the right arm, complete the elevation of the lower limbs, and the descent as in sixth exercise (Fig. 6).

This exercise to be repeated over the left hand.

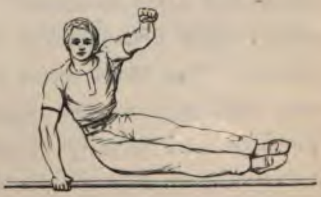
TO VAULT THE BAR WITH ONE HAND.

Single Series.
Exercise 10.
COURSE IV.

Position of attention facing the line of the bar, the bar on the left.

1. Grasp the bar strongly with the left hand, slightly bend the lower limbs, and on their return extension, spring from the ground, incline the body strongly over the right arm, rapidly elevate the left hand above the head, and pass the lower limbs, straight and together, over the bar (Fig. 7), quit the grasp, and descend yielding, facing the bar.

Fig. 7.



THE VAULTING HORSE.

This is a machine of a much higher order than the bar, and presenting a much wider range of exercises, second to none in value and number.

The three series into which the exercises divide themselves are very distinctly marked, and admit of progressive practice long after the correct action and position have been attained, by increasing the elevation of the machine.

These exercises can scarcely be too frequently practised, as they give valuable and widely varied employment to both upper and lower limbs, and also to the trunk; and this machine is always found an excellent one with which to begin the lesson, because it affords much and rapid movement without severe or localized effort. The first series is clearly introductory to the second. The third series is very artistic and effective, and cultivates to the highest attainable point that precision and security of grasp and spring which are so valuable in all exercises when practically applied.

The position of the instructor should be close to the machine, in front of the learner, directing
motion, and in the early stages of his prac-
nting the time of his movements, and pointing

out to him the features of the position in the ascent, rest, and descent. The instructor should also repeatedly execute the exercise himself in the manner most likely to make the learner comprehend its peculiarities, at the same time encouraging him, if timid or hesitating, and losing no opportunity of obtaining his entire confidence and trust in every situation however critical, remembering always that nothing will so readily make a man fall as the fear of falling.

There should be at least two vaulting-horses in a Gymnasium, of the respective heights of 4 feet and 5 feet; where a third is provided, its height should be 5 feet 6 inches. The bodies should be formed of blocks of wood from 5 feet to 5 feet 6 inches in length, and 12 inches in width, supported by strong framed legs screwed to the floor. The tops should be carefully rounded in every direction, so as to give a convenient seat for the body, and surface for the hands, whether the horse be used from the sides, or from the croup. The centre portion should be carefully padded and covered with strong leather.

First Series...... *Standing.*
Second Series .... *Running.*
Third Series...... *By the croup.*

TO VAULT ON THE HORSE IN TWO MOVEMENTS.

First Series.
Exercise 1.
Course I.

Position of attention close beside the horse.

1. Raise the hands and place them at the distance on the back of the horse, the thumbs and fingers straight and together, and pointed to the front (Fig. 1); bend the legs, and on their return extension spring from the ground, inclining the body to the front, press strongly with the hands, extend the arms, and raise the

Fig. 1.

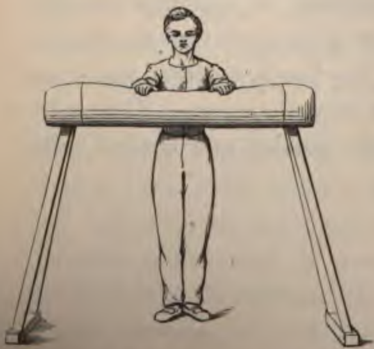
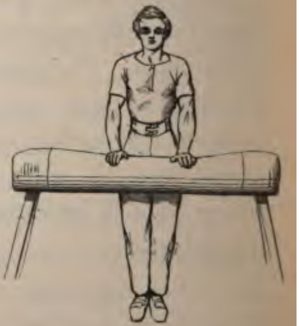
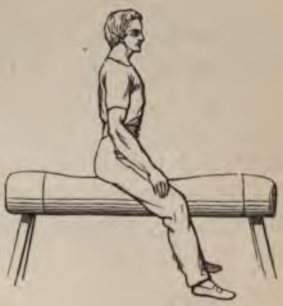


Fig. 2.



nk of the body above the horse, the legs straight and er, the feet together, and pointed to the ground

Fig. 3.



2. Elevate the right leg, and by a continuous movement bring it over the back of the horse, the column of the body turning with it, and as the right thigh approaches the right hand, advance the latter in a line with the left hand, and slowly lower the body to the saddle, bringing the head erect and the chest and trunk well advanced, the hands lightly resting on the thighs; the lower limbs pendent, the toes pointed to the front (Fig. 3).

In descending, incline the head and trunk of the body to the front, elevate the left leg to the rear until it clears the back of the horse, the right rising to meet it, press from the hands, and descend yielding, facing the horse.

This exercise to be repeated on the left.

TO VAULT ON THE HORSE IN ONE MOVEMENT.

First Series. Position as in first exercise.
Exercise 2. 1 and 2. As in first exercise, except that
COURSE I. the right leg should ascend and clear the back of the horse, in a continuous movement from the ground to the seat in the saddle.

Descend as in first exercise.

This exercise to be repeated on the left.

TO VAULT OVER THE HORSE IN TWO MOVEMENTS.

First Series.
Exercise 3.
Course I.

Position as in first exercise.

1. As in first exercise to the extension of the arms (Fig. 4).

2. Elevate both limbs in position to the right, and pass them over the horse, incline the head and shoulders forward, advancing the right hand in a line with the left (Fig. 5), press from both hands, and descend yielding, facing the horse.

Fig. 4.

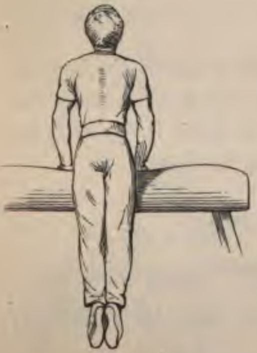
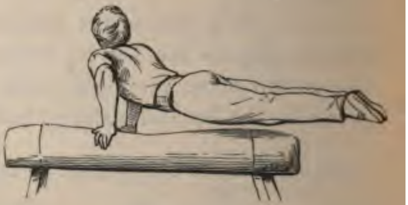


Fig. 5.



This exercise to be repeated, passing by the left.

TO VAULT OVER THE HORSE IN ONE MOVEMENT.

First Series.
Exercise 4.
RSE I.

Position as in first exercise.

1 and 2. As in previous exercise, except that the legs should ascend and clear

the back of the horse in one continuous movement; after the advance of the right hand, press strongly from both and descend yielding, facing the horse.

As the body clears the horse the trunk and lower limbs should be extended in the line of the horse, the arms bent, the chest advanced, the head thrown back.

This exercise to be repeated, passing by the left.

TO VAULT ON THE HORSE RESTING ON THE KNEES.

First Series.
Exercise 5.
COURSE II.

Position as in first exercise.

1. Raise the hands and place them at the distance on the back of the horse, as in first exercise; bend the legs, and on their return extension spring from the ground, press strongly

Fig. 6.

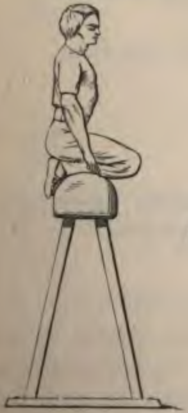


Fig. 7.

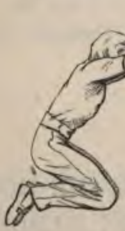
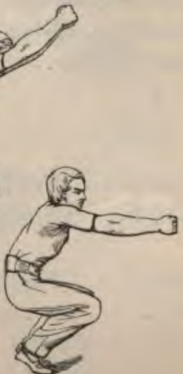


Fig. 8.



with the hands, incline the head and shoulders forward, extend the arms, and bring the knees straight up between them, resting on the saddle (Fig. 6). In descending, rapidly throw the hands to the front, as high as the face, spring from the rest with the lower limbs, upward and forward (Fig. 7), and descend yielding (Fig. 8).

TO VAULT ON THE HORSE RESTING ON THE FEET.

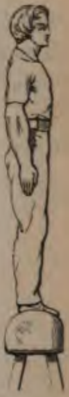
First Series.
Exercise 6.
COURSE III.

Position as in first exercise.

1. As in preceding exercise, except that the knees should be brought up between the arms until they are as high as the breast, and the feet instead of the knees brought to the rest on the saddle; immediately straighten the legs and come to the position of attention (Fig. 9).

In descending, spring straight to the front, and descend yielding.

Fig. 9.



TO VAULT OVER THE HORSE BETWEEN THE HANDS.

First Series.
Exercise 7.
SE IV.

Position as in first exercise.

1. As in preceding exercise, except that the feet, instead of resting on the saddle, should be shot through the space between

Fig. 10.

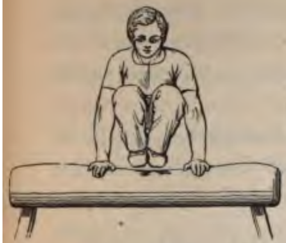


Fig. 11.

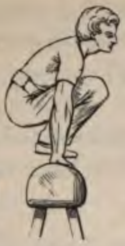
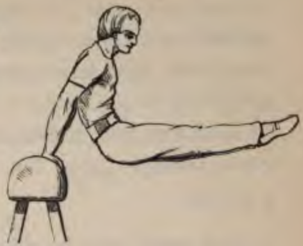


Fig. 12.



the hands (Figs. 10, 11, and 12); press from the hands, and descend yielding.

TO VAULT ON THE HORSE WITH ONE HAND.

First Series.
Exercise 8.
COURSE IV.

Position of attention facing the line of the horse.

1. Raise the left hand and place it on the horse, and extend the right arm to the rear (Fig. 13).

Fig. 13.

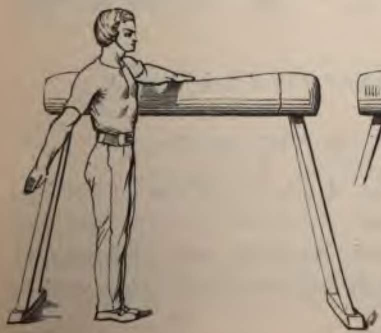
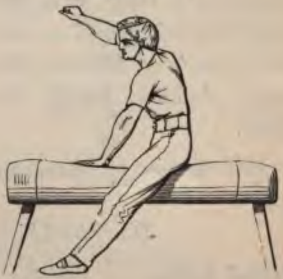


Fig. 14.



2. Bend the legs as in first exercise, and on the return extension, elevate the right leg, and pass it over the horse, at the same time rapidly elevating the right arm above the head, the hand closed, and come to the seat in the saddle (Fig. 14).

In descending, incline the head and shoulders to the front, press strongly from the left hand and descend as in first exercise.

This exercise to be repeated with the right hand.

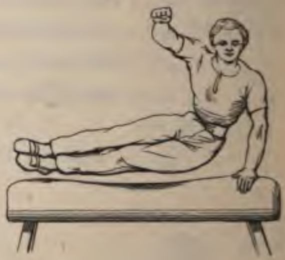
TO VAULT OVER THE HORSE WITH ONE HAND.

First Series.
Exercise 9.
COURSE IV.

Position as in eighth exercise.

1. As in eighth exercise.

Fig. 15.



2. As in eighth exercise to the spring; press strongly with the left hand, elevate the right, pass the lower limbs in position over the horse (Fig. 15), and descend yielding, facing the horse.

This exercise to be repeated with the right hand.

TO VAULT ON THE HORSE.

Second Series.
Exercise 10.
COURSE I.

Position of attention 25 or 30 feet from the horse.

1. Slowly begin the run, quickening the pace on the advance, and looking straight

at the horse; when within 2 or 3 feet of the horse, spring from both feet, striking them full and flat upon the ground, the hands taking their place on the back of the horse immediately after the spring, pass the right leg over the horse, and come to the seat in the saddle in one movement, as in Fig. 3.

In descending, incline the head and trunk of the body to the front, elevate the lower limbs to the rear straight above the horse, the toes pointed upward (Fig. 16); slowly let the lower limbs, with the entire column of the body in position, fall to the right and gradually descend over the arm until the feet come to the ground, the horse on the right (Fig. 17); descend yielding.

This exercise to be repeated on the left.

Fig. 16.

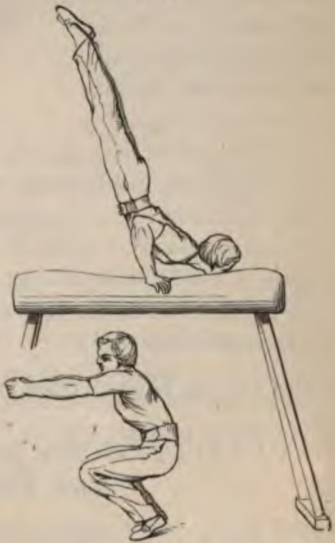


Fig. 17.

TO VAULT OVER THE HORSE.

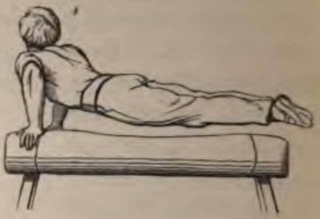
Second Series.
Exercise 11.
COURSE I.

Position as in tenth exercise.

1. As in tenth exercise quickening the pace to the utmost speed; spring as in

preceding exercise, passing the lower limbs in position over the horse to the right (Fig. 18), advance the right hand opposite the left, press strongly, and descend yielding, facing the horse.

Fig. 18.



In this exercise the body should be thrown well forward in the spring, the feet should describe a semicircle, beginning at the point where they quit the ground, and finishing where they alight, the hands being the centre upon which the trunk and lower limbs turn; during this exercise, therefore, the chest should be continually turning towards the horse, the legs should be straight and together, the toes pointed, the whole body, when in the act of clearing the horse, forming one horizontal line over it.

This exercise to be repeated on the left.

TO VAULT ON THE HORSE RESTING ON THE KNEES.

Second Series.
Exercise 12.
COURSE II.

Position as in tenth exercise.

1. As in tenth exercise; spring straight to the front, the hands taking their place on the back of the horse immediately after the spring, bring both legs, with the knees closely bent up, between the arms and come to the rest on the knees, as
xercise, Fig. 6.
s in fifth exercise, Figs. 7 and 8.

TO VAULT ON THE HORSE RESTING ON THE FEET.

Second Series.
Exercise 13.
COURSE III.

Position as in tenth exercise.

1. As in preceding exercise, except that the feet, instead of the knees, are placed on the saddle, straighten the legs, as in sixth exercise, Fig. 9.

In descending, extend the arms, spring straight to the front, and descend yielding.

TO VAULT OVER THE HORSE BETWEEN THE HANDS.

Second Series.
Exercise 14.
COURSE IV.

Position as in tenth exercise.

1. As in preceding exercise, except that the legs are still more closely bent up, and the feet, instead of resting on the saddle, are shot through between the hands, as in seventh exercise, Figs. 10, 11, and 12; press from the hands as the feet clear the horse, and descend yielding.

TO VAULT OVER THE HORSE BY THE BACK LIFT.

Second Series.
Exercise 15.
COURSE IV.

Position as in tenth exercise.

1. As in tenth exercise to the spring; place the hands upon the horse, depress the head and shoulders until the latter are as low as the hands, and at the same time elevate the lower

limbs, hips, and loins by the rear, until they rise perpendicularly over the hands (Fig. 19), the legs straight and together, the toes pointed upwards; continue the sweep of the lower limbs, let the feet fall to the front, bending the back inwards (Fig. 20), and descend yielding.

Fig. 19.

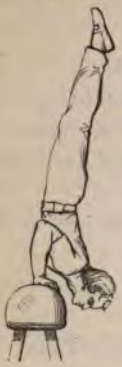
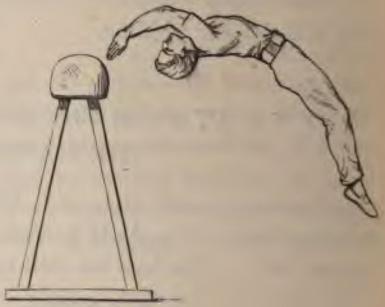


Fig. 20.



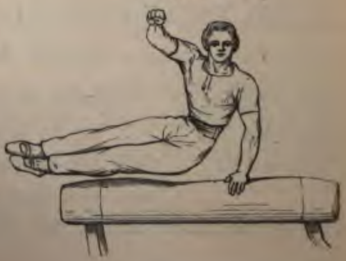
TO VAULT OVER THE HORSE WITH ONE HAND.

Second Series. Position as in tenth exercise.

Exercise 16.
Course IV.

1. As in tenth exercise to the spring; place the left hand on the back of the horse, throw the right arm above the head, and pass the limbs in position rse (Fig. 21),

Fig. 21.



lean forward when clearing it, press strongly with the left hand, and descend yielding, the horse on the left.

This exercise to be repeated with the right hand.

TO VAULT TO THE CROUP.

Third Series.
Exercise 17.
COURSE II.

Position of attention 25 or 30 feet from the horse, facing the croup.

1. Slowly begin the run, quickening the pace on the advance, and when within 2 or 3 feet of the croup, spring from both feet, immediately placing the hands on the croup, right and left; fully separate the lower limbs during the rise, and as the body reaches the croup advance the hands 6 or 8 inches along the back of the horse, and lightly sink to the seat on the croup (Fig. 22); the head and column of the body slightly inclined to the front, the lower limbs straight, the toes pointed to the front.

Fig. 22.

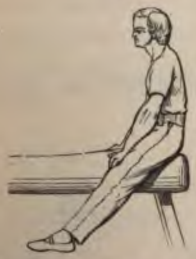
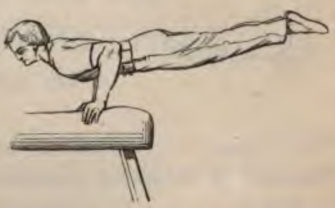


Fig. 23.



In descending, incline the head and trunk to the horizontal line of the horse, elevate the lower limbs, straight and together, until they are in a line with the body (Fig. 23), shoot them out far to the rear, at the same time pressing from the hands, and descend yielding, facing the croup.

TO VAULT TO THE SADDLE.

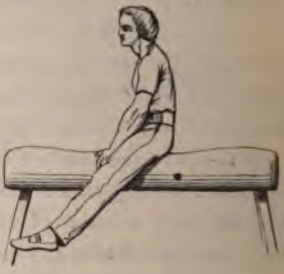
Third Series.
Exercise 18.
COURSE III.

Position as in seventeenth exercise.

1. As in preceding exercise, until the lower limbs rise above the croup, but instead of allowing them to rest, continue the momentum of the spring, rapidly advance both hands to the saddle and lightly sink to the seat, place the hands on the thighs, the head erect, the breast advanced, as in Fig. 3.

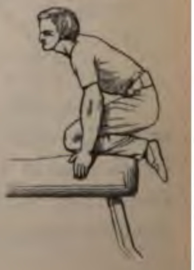
In descending, replace the hands on the horse (Fig. 24), elevate the lower limbs, and descend as in tenth exercise, Figs. 16 and 17.

Fig. 24.



TO VAULT TO THE CROUP, RESTING ON THE KNEES.

Fig. 25.



Third Series.
Exercise 19.
COURSE II.

Position as in seventeenth exercise.

1. As in seventeenth exercise to the spring; bring both legs, with the knees closely bent, up between the arms, and let them rest on the croup between the ig. 25).

In descending, incline the head and trunk of the body to the front, slowly elevate the lower limbs, and shoot them to the rear, as in seventeenth exercise (Fig. 23), and descend yielding.

TO VAULT TO THE CROUP, RESTING ON THE FEET.

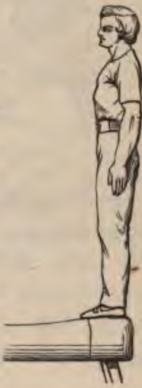
Third Series.
Exercise 20.
COURSE III.

Position as in seventeenth exercise.

1. As in preceding exercise, except that the knees are lifted above the croup, as high as the breast, and the soles of the feet placed on the horse, straighten the legs, rising from the palms to the tips of the fingers, and stand upright on the croup (Fig. 26).

In descending, re-bend the knees, spring backwards, and descend yielding, facing the croup.

Fig. 26.



TO VAULT TO THE CROUP, THE LEGS ON THE RIGHT.

Third Series.
Exercise 21.
COURSE IV.

Position as in seventeenth exercise.

1. As in seventeenth exercise to the spring, but instead of separating the lower limbs, keep them together, and during the

rise to the croup, pass them to the right, and slowly sink to the side-seat on the croup (Fig. 27).

Fig. 27.

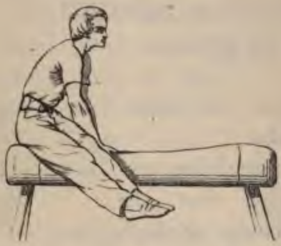
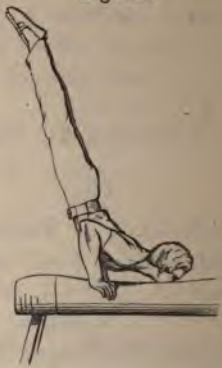


Fig. 28.



In descending, incline the head and shoulders to the front, press strongly from the hands, elevate the lower limbs over the horse until they are above the head (Fig. 28), slowly let the lower limbs, with the entire column of the body, fall to the left, and gradually descend over the arm, until the feet come to the ground, the horse on the left.

This exercise to be repeated on the left, descending on the right.

TO VAULT TO THE CROUP, THE LEGS PASSING FROM RIGHT TO LEFT.

d Series. Position as in seventeenth exercise.

22. 1. As in preceding exercise, until the rise above the croup, but instead of allowing the legs to rest upon it, continue the momentum of the spring, lifting the right hand, and extending it rapidly above the head, and carry the limbs forward and upward over the horse in front (Fig. 29), and turning completely round upon the left hand, descend yielding, facing the line of the horse, the horse on the left (Fig. 30).

This exercise to be repeated, the legs passing from left to right.

Fig. 29.

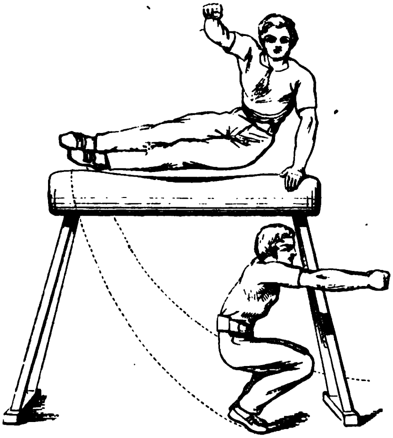


Fig. 30.

* * *

SECTION III.

ELEMENTARY EXERCISES.

As stated in the Introduction explanatory of the system prepared by me for the Army*, there are two senses in which every exercise may be viewed; 1st, in its elementary sense, or the manner in which it tends to cultivate the body by increasing its dexterity and rapidity of action, its strength in the overcoming of resistance, and its power of enduring protracted exertion; 2nd, in its practical sense, or in the power to be acquired through its practice of overcoming obstacles similar in nature to the machine on which it is practised, which may be encountered in the performance of the active duties of the soldier.

It was in the same place pointed out that whatever tends to strengthen the soldier's frame, also tends directly to aid him in his professional duties, and that the performance of these duties will also in return tend to strengthen his frame, so that an absolute line of distinction between these two features cannot be drawn; but at the same time there is an extended series of exercises, which have for immediate object the culture of the physical powers, without direct reference to any professional application of the exercises themselves.

A Military System of Gymnastic Exercises, for the use of Instruc
he Army. Adjutant-General's Office, Horse Guards.

The section upon which we are entering is of this class; its exercises are essentially elementary; its object being to place in the hands of the instructor an ample range of exercises by which he will be able, in accordance with the law that the physical development of any part of the body shall be in relation to its activity, to reach any part that may be in special need, and bring it to the standard of the rest of the body, and also to cultivate the entire physical resources of the learner to their highest attainable point; and specially to give a full share of employment to the trunk and upper limbs. In a large portion of the exercises of this section the lower limbs act but a secondary part, the effort required being made chiefly by the trunk and the arms.

The apparatus of this section is the very heart of the gymnasium proper, indeed more than one of the machines (as the fixed parallel bars, the trapezium, &c.) is virtually a gymnasium in itself when in the hands of a skilful instructor; for there is scarcely a part of the body which its exercises do not reach; while there is scarcely any exercise in its extended range which may not be modified to meet the first essay of the weakest or most timid beginner, and yet when executed in its perfect manner, is not capable of testing and increasing the strength and dexterity of the most practised gymnast. From their great variety and peculiarly interesting nature they are invariably favourites with learners in every stage of advancement.

THE FIXED PARALLEL BARS.

ALL exercises on this machine are performed between the bars, and are all virtually executed by the trunk and upper limbs, especially the former. They all begin with the body in the position given in the first exercise, with the feet lifted clear from the ground.

The exercises naturally divide themselves into three series:—The first comprises those which consist of *travelling* along the bars, following the natural shape and construction of the machine, to front or rear, single or double handed; the second, those of *oscillation* between the bars, in which the exercises may be said to consist of an evolution, more or less complicated, passing from front to rear, or *vice versâ*, between two points, of which the hand-grasp forms, as it were, the pivot or centre. This is a most valuable and attractive series, giving abundant and varied exercise to the entire column of the body, and to the arms whether bent or extended; the third series is a *combination* of these two, also valuable, as strongly addressing the trunk of the body.

Every exercise is here given in its perfect form, but with beginners of ordinary physical capacity, they may d should be approached through several stages of less culty. Thus, in those of the first series, the perfectly upright position of body, advanced breast, straight limbs, and erect head, may be departed from in the earlier stages of practice. Also, a free lateral inclination from hand to hand; and, in the front and rear exercises, with both hands at once, a more energetic upright lift of the lower limbs may be allowed.

The second series may be approached, first, by beginning with the feet between the uprights, near the entrance to the bars, with or without a spring, as may be required; second, from the centre of the bars under the hands and from the ground direct, with or without a spring; third, as given in the text, with the feet free from the ground, in position, the action coming from the loins, resting entirely on the hands. This machine is invaluable in a gymnasium, the exercises being not only numerous, but varied, interesting, and in themselves pleasurable, capable of much artistic effect, and requiring equally muscular power and dexterity of action in trunk and limb. Again, there is no single exercise on this machine which requires violent or sudden effort; all the movements flow from one point to another, and the skill displayed in their execution and the advantage obtained from their practice lie in the certainty, steadiness, and regularity with which the complex action of the step is performed.

A point demanding very careful observance is, that the learner shall never separate his legs while executing the exercises of the second series; they must be kept rigidly in position, and this principle must be firmly inculcated from the first day's lesson.

The Parallel Bars should be from 8 feet to 10 feet long, 20 inches apart inside, and fixed at a height from the floor of 3 feet 8 inches. The upper surface of the bars should be rounded to fit the hands.

FIRST SERIES . . . . . . *Travelling.*
SECOND SERIES . . . . . *Oscillating.*
THIRD SERIES . . . . . . *Combinations.*

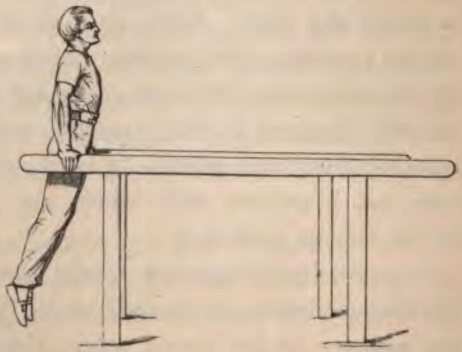
THE SINGLE MARCH FORWARDS.

First Series.
Exercise 1.
COURSE I.

Position of attention at the entrance to the bars.

1. Raise the hands and place them on the bars, the thumbs inside, the fingers outside, extended, and pointed downwards; press from the hands until the arms are completely extended, the head upright, the eyes directed to the front, the chest advanced, the

Fig. 1.



shoulders square to the front, the column of the body upright and firm, the lower limbs straight and together, the feet together and pointed to the ground (Fig. 1).

2. Rest on the left hand, advance the right six inches beyond it along the bar, advance the left six inches beyond the right. Repeat.

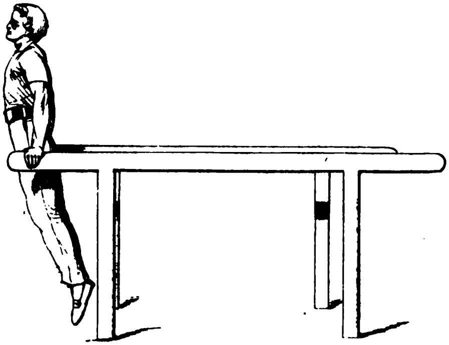
THE SINGLE MARCH BACKWARDS.

First Series.
Exercise 2.
COURSE I.

Position of attention, the back to the bars.

1. As in first exercise (Fig. 2).

Fig. 2.



2. Rest on the left hand and advance the right, the left following on the left, as in first exercise. Repeat.

and pass them over the right bar (Fig. 6); when clear of the bar, relax the extension of the limbs, press strongly from the left hand, spring to the ground, and descend yielding.

This exercise to be repeated, clearing the left bar.

TO CLEAR THE BAR BY THE REAR.

Second Series.
Exercise 6.
COURSE II.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs to the front, as in preceding exercise, and on their return oscillation to the rear incline the head and shoulders to the front, bending the arms, and elevate the lower limbs, the toes pointed to the rear, until they rise above the level of the bars, and pass them over the right bar; (at this point the lower limbs, trunk and head, are in the horizontal line of the bars, Fig. 7), press strongly from the left hand, clear the right bar, spring to the ground, and descend yielding, facing the bars.

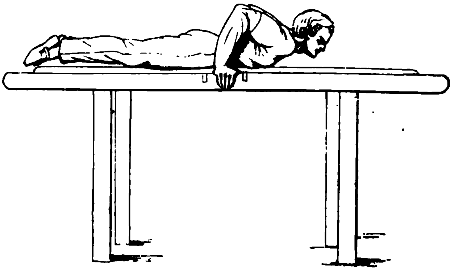


Fig. 7.

This exercise to be repeated, clearing the left bar.

TO CLEAR THE BAR BY THE REAR.

A SECOND METHOD.

Second Series.
Exercise 7.
COURSE III.

Position as in fifth exercise.

1. As in fifth exercise.

2. Slowly incline the head and shoulders to the front, without swing, bending the arms, elevating the lower limbs to the rear, and clearing the bar, as in preceding exercise.

This exercise to be repeated, clearing the left bar.

TO REST ON THE LEFT BAR AND CLEAR THE RIGHT, BY THE FRONT.

Second Series.
Exercise 8.
COURSE I.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs in position to the front until they rise above the level of the bars, pass them over and let them rest on the left bar, relaxing the extension (Fig. 8).

Fig. 8.

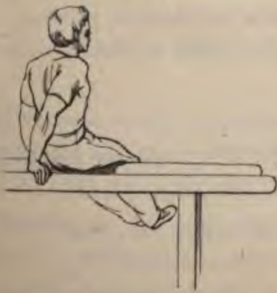
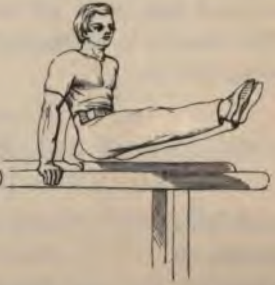


Fig. 9.



3. Press strongly with the hands, elevate the lower limbs

in position above the bar, sweep them across and clear both bars to the right front (Fig. 9), and descend yielding, facing the line of the bars.

This exercise to be repeated, resting on the right bar, and clearing the left.

TO REST ON THE LEFT BAR AND CLEAR THE RIGHT, BY THE REAR.

Second Series.
Exercise 9.
COURSE II.

Position as in fifth exercise.

1. As in fifth exercise.

2. Slowly incline the head and shoulders to the front, bending the arms; elevate the lower limbs, the toes pointed to the rear, until they rise above the level of the bars, as in Fig. 7; at this point pass them over and let them rest on the left bar, relaxing the extension, the feet together, the toes pointed downwards, as in Fig. 19.

3. Incline the head and shoulders to the front, bend the arms until the shoulders are as low as the bars, and at the same time elevate the lower limbs in position, sweep them across both bars to the left rear, and descend yielding.

This exercise to be repeated, resting on the right bar and clearing the left.

TO REST ON THE RIGHT BAR IN FRONT AND CLEAR IT BY THE REAR.

Second Series.
Exercise 10.
COURSE II.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs in position to the front, until they rise above the level

of the bars, pass them over and let them rest on the right bar, relaxing the extension (Fig. 10); press strongly with the hands, elevate the lower limbs in position above the bar, pass them between the bars, and let them swing to the rear, at the same time bending the arms until the shoulders are as low as the bars, and bringing the column of the body with the lower limbs to the horizontal line of the bars (Fig. 11); clear the right bar by the rear and descend yielding, facing the bars.

Fig. 10.

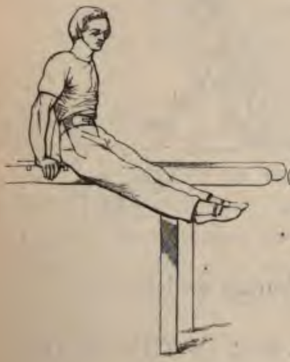
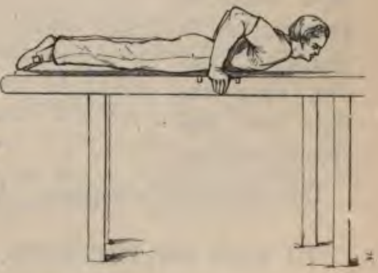


Fig. 11.



This exercise to be repeated on the left bar.

The same exercise to be repeated with the following variations :—

1. Resting on the right bar in the front and clearing the left by the rear.

2. Resting on the left bar in the front and clearing the right by the *rear.*

TO REST ON BOTH BARS IN FRONT, AND CLEAR THE RIGHT BY THE REAR.

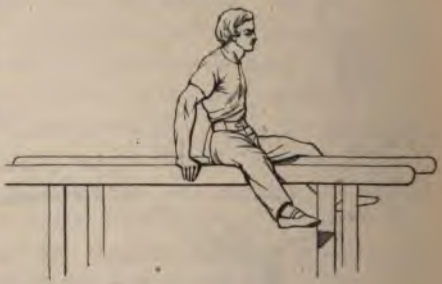
Second Series.
Exercise 11.
COURSE II.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs in position, the toes pointed to the front, until they rise above the level of the bars; at this point separate the lower limbs and let them fall to the rest on the bars (Fig. 12); re-elevate them above the bars, coming to the position at the elevation, let them sweep to the rear, as in preceding exercise, clear the right bar, and descend yielding.

Fig. 12.



This exercise to be repeated, clearing the left bar.

TO REST ON THE LEFT BAR IN THE REAR, AND CLEAR IT BY THE FRONT.

Second Series.
Exercise 12.
COURSE II.

Position as in fifth exercise.

1. As in fifth exercise.

2. As in ninth exercise to the rest on the bar; incline the head and shoulders to the front, bend the arms until the shoulders are as low as the bars, the head between them, re-elevate the lower limbs *position,* passing them between the bars, let them sweep

to the front and clear the left bar, as in Fig. 9, and descend yielding. During the last movement bring the head and shoulders to the vertical position, gradually straighten the arms and retain them straight while the feet clear the bar.

This exercise to be repeated on the right bar.

The same exercise to be repeated with the following variations:—

1. Resting on the left bar in the rear, and clearing the right in the front.

2. Resting on the right bar in the rear, and clearing the left by the front.

TO REST ON BOTH BARS IN THE REAR, AND CLEAR THE RIGHT BAR BY THE FRONT.

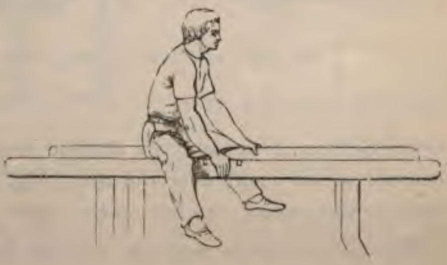
Second Series.
Exercise 13.
COURSE II.

Position as in fifth exercise.

1. As in fifth exercise.

2. Slowly incline the head and shoulders to the front, bending the arms, elevate the lower limbs to the rear, until they rise above the level of the bars, fully separate them and let them fall to the rest on the bars (Fig. 13); incline the head and shoulders to the front, re-elevate the lower limbs, and as they sweep to the front in position, let them clear the right bar, and descend yielding.

Fig. 13.



This exercise to be repeated, clearing the left bar.

TO PASS BY THE REAR BY THE SINGLE SWING.

Second Series.
Exercise 14.
COURSE III.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs in position until the feet are as high as the face; from this let them fall in a full sweep, and passing between the bars, rise to the rear until they are above the head; during the latter half of this oscillation, let the arms slowly bend until the shoulders are as low as the bars, the head between them (Fig. 14); slowly let the lower limbs with the entire column of the body in position incline, and gradually descend to the right over the arm (Fig. 15), until the feet come to the ground, the bar on the right.

Fig. 14.

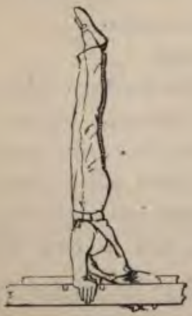
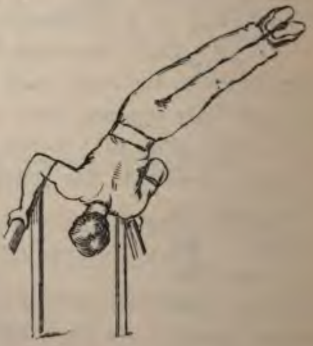


Fig. 15.



is exercise to be repeated over the left bar.

TO REST ON THE LEFT BAR IN FRONT, AND CLEAR IT IN THE REAR BY THE SINGLE SWING.

Second Series. Position as in fifth exercise.

Exercise 15. 1. As in fifth exercise.

COURSE III. 2. Elevate the lower limbs in position to the front, to the level of the bars, pass them over and let them rest on the left bar, relaxing the extension (Fig. 16); re-elevate the lower limbs in position above the bar, pass them between the bars, and as in preceding exercise, incline the head and shoulders to the front, complete the rearward oscillation (Fig. 17), descending to the ground over the left bar, the bar on the left.

Fig. 16.

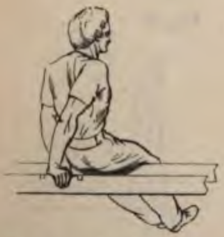
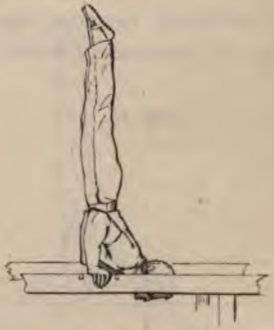


Fig. 17.



This exercise to be repeated over the right bar.

The same exercise to be repeated with the following variations:—

1. Resting on the left bar in front and clearing the right in the rear.

2. Resting on the right bar in front and clearing the left in the rear.

TO REST ON BOTH BARS IN FRONT, AND CLEAR THE LEFT BAR IN THE REAR BY THE SINGLE SWING.

Second Series.
Exercise 16.
COURSE III.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs in position, the toes pointed to the front, until they rise above the level of the bars; at this point separate the lower limbs and let them fall to the rest on the bars (Fig. 18); press strongly with the hands, re-elevate the lower limbs above the bars, and as they sweep to the rear, incline the head and shoulders to the front, bending the arms as in fourteenth exercise, complete the rearward oscillation (Fig. 19), descending to the ground over the left bar.

Fig. 18.

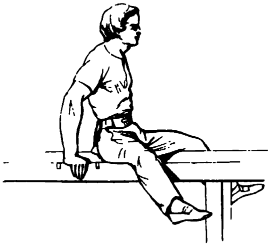
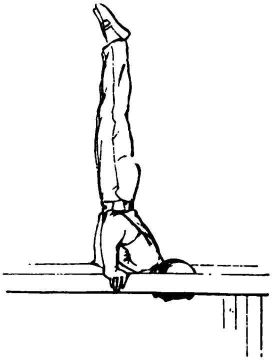


Fig. 19.



This exercise to be repeated clearing the right bar.

TO REST ON THE LEFT BAR IN THE REAR BY THE SINGLE SWING AND CLEAR THE RIGHT BY THE REAR.

Second Series.
Exercise 17.
Course III.

Position as in fifth exercise.

1. As in fifth exercise.

2. As in fourteenth exercise until the elevation of the feet above the head; at this point relax the extension of the legs, pass them over and let them rest on the left bar (Fig. 20); incline the head and shoulders to the front, bend the arms until the shoulders are as low as the bars, the head between them, and at the same time again elevate the lower limbs above the head (Fig. 21); pass them across the bars to the right, descending over the right bar.

Fig. 20.

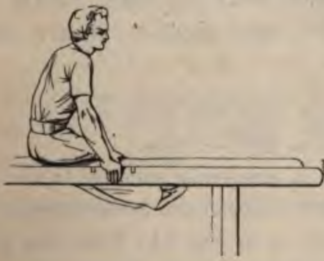
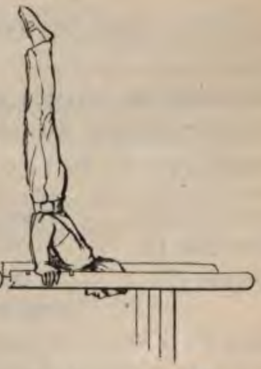


Fig. 21.



This exercise to be repeated resting on the right bar and clearing the left.

TO REST ON BOTH BARS IN THE REAR BY THE SINGLE SWING AND CLEAR THE RIGHT BY THE REAR.

Second Series.
Exercise 18.
COURSE III.

Position as in fifth exercise.

1. As in fifth exercise.

2. As in preceding exercise to the elevation of the feet above the head; at this point slowly separate the lower limbs, relaxing the extension and bring them to the rest one on each bar (Fig. 13); incline the head and shoulders to the front, and bend the arms as in preceding exercise, elevate the lower limbs above the head, and pass the legs over the right bar as in preceding exercise.

This exercise to be repeated over the left bar.

TO REST ON THE LEFT BAR IN THE REAR BY THE SINGLE SWING AND CLEAR IT BY THE FRONT.

Second Series.
Exercise 19.
COURSE III.

Position as in fifth exercise.

1. As in fifth exercise.

2. As in preceding exercise to the rest on the left bar, and the re-elevation of the lower limbs above the head, as in Fig. 21; from this point let the lower limbs slowly descend in position and passing between the bars sweep to the front, clear the right bar and descend yielding. During the descent of the lower limbs, bring the head and shoulders to the vertical position, gradually aighten the arms, and retain them straight while the feet r *the* bar.

This exercise to be repeated resting on the right bar in the rear and clearing it in the front.

The same exercise to be repeated with the following variations:—

1. Resting on the left bar in the rear and clearing the right in the front.
2. Resting on the right bar in the rear and clearing the left in the front.

TO REST ON BOTH BARS IN THE REAR BY THE SINGLE SWING AND CLEAR THE RIGHT BAR BY THE FRONT.

Second Series.
Exercise 20.
Course III.

Position as in fifth exercise.

1. As in fifth exercise.
2. As in fourteenth exercise to the elevation of the lower limbs above the head; at this point slowly separate the legs, relaxing the extension, and let them fall to the rest, one on each bar; incline the head and shoulders to the front, bend the arms, re-elevate the lower limbs above the head; from this point let the lower limbs descend as in preceding exercise, clear the right bar and descend yielding.

This exercise to be repeated, clearing the left bar.

TO PASS BY THE FRONT BY THE DOUBLE SWING.

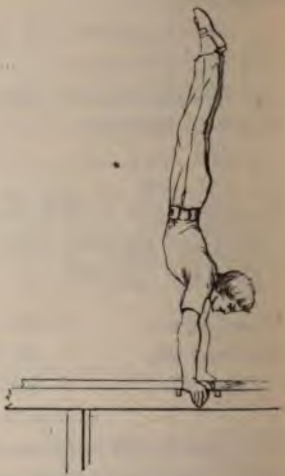
Second Series.
Exercise 21.
Course IV.

Position as in fifth exercise.

1. As in fifth exercise.
2. Elevate the lower limbs in position

until the feet are as high as the face; from this point let them descend, and, sweeping between the bars, ascend to the rear until they are above the head, the arms remaining straight, the column of the body and the lower limbs slightly curved throughout their length (Fig. 22); from this point let the feet again descend, and passing between the bars on the return oscillation, clear the right bar in front, and descend yielding.

Fig. 22.



This exercise to be repeated over the left bar.

TO REST ON THE LEFT BAR IN FRONT AND CLEAR IT BY THE DOUBLE SWING.

Second Series.
Exercise 22.
COURSE IV.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs in position to the level of the bars, pass them over and let them rest on the left bar, relaxing the extension as in Fig. 16; press strongly with the hands, re-elevate the lower bs above the bar, pass them between the bars, and com- the double swing as in preceding exercise, clearing ft bar.

This exercise to be repeated on the right bar.

The same exercise to be repeated with the following variations:—

1. Resting on the left bar in front and clearing the right.

2. Resting on the right bar in front and clearing the left.

TO REST ON BOTH BARS IN FRONT AND CLEAR THE LEFT BAR BY THE DOUBLE SWING.

Second Series.
Exercise 23.
COURSE IV.

Position as in fifth exercise.

1. As in fifth exercise.

2. Elevate the lower limbs in position to the front, until they rise above the level of the bars; separate them and let them fall to the rest, one on each bar, as in Fig. 18; press strongly with the hands, re-elevate the lower limbs above the bars, and complete the double swing as in twenty-first exercise, clearing the left bar.

This exercise to be repeated clearing the right bar.

THE SINGLE MARCH AND REST FORWARDS.

Third Series.
Exercise 24.
COURSE IV.

Position as in first exercise.

1. As in first exercise.

2. Elevate the lower limbs in position and bring them to the rest on the left bar, as in preceding exercises; incline the head and shoulders to the front, re-grasp the bars in advance of the thighs

(Fig. 23), re-elevate the lower limbs until the feet are above the head, as in seventeenth exercise (Fig. 24); from this

Fig. 23.

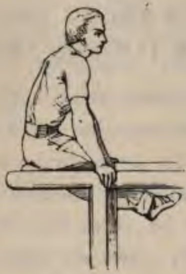
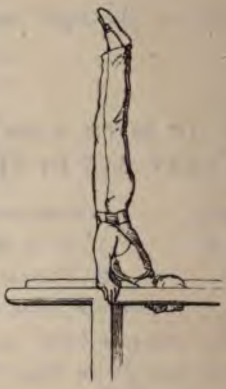


Fig. 24.



point let them slowly descend in position, and passing between the bars, sweep to the front, and again come to the rest on the left bar. During the descent of the lower limbs, gradually straighten the arms, and retain them straight until the legs rest on the bar. Repeat.

At the end of the bars on the last elevation of the feet above the head, incline the trunk and lower limbs over the left bar and descend yielding as in fourteenth exercise.

This exercise to be repeated on the left bar.

The same exercise to be repeated resting on the right and bar alternately.

THE SINGLE MARCH AND REST BACKWARDS.

Third Series.
Exercise 25.
COURSE IV.

Position as in second exercise.

1. As in second exercise.

2. As in fourteenth exercise to the elevation of the feet above the head; at this point relax the extension of the legs, pass them over and let them rest on the right bar; pass both hands behind the thighs and re-grasp the bars (Fig. 25), re-elevate the lower limbs, pass them between the bars, and again let them rise above the head (Fig. 26) and again come to the rest on the right bar. Repeat.

Fig. 25.

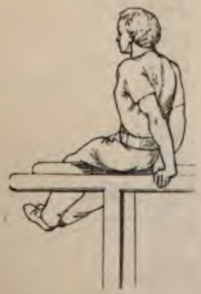
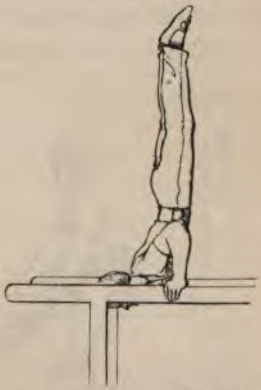


Fig. 26.



At the end of the bars, on the last elevation of the feet above the head, pass over the right bar, as in preceding exercise.

This exercise to be repeated on the left bar.

The same exercise to be repeated, resting on the right and left bar alternately.

THE DOUBLE MARCH AND REST FORWARDS.

Third Series.
Exercise 26.
COURSE IV.

Position as in first exercise.

1. As in first exercise.

2. Elevate the lower limbs in position, the toes pointed to the front, until they rise above the level of the bars; at this point separate the lower limbs and let them fall to the rest on the bars; incline the head and shoulders to the front, re-grasp the bars in advance of the thighs (Fig. 27), re-elevate the lower limbs until the feet are above the head, as in twenty-fourth exercise (Fig. 28); let the lower limbs descend as in twenty-fourth exercise and again come to the rest in front on both [illegible]

[illegible] Repeat.

[illegible] the end of the bars on the last elevation of the feet [illegible] *the* head, continue the movement of the lower limbs,

Fig. 27.

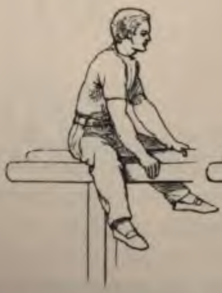
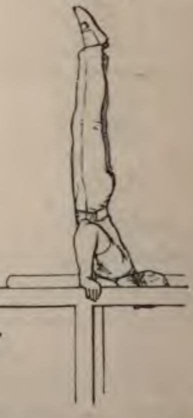


Fig. 28.



carrying the feet completely over the head to the front, press strongly with the hands and descend yielding, the back to the end of the bars.

THE DOUBLE MARCH AND REST BACKWARDS.

Third Series.
Exercise 27.
Course IV.

Position as in second exercise.

1. As in second exercise.

2. As in fourteenth exercise to the elevation of the feet above the head; at this point slowly separate the legs, relaxing the extension, and let them fall to the rest, one on each bar; pass both hands behind the thighs, and re-grasp the bars (Fig. 29); re-elevate the lower limbs to the front, pass them between the bars, and let them rise until they are above the head (Fig. 30); slowly separate the legs, relaxing the extension and again come to the rest on the bars. Repeat.

Fig. 29.

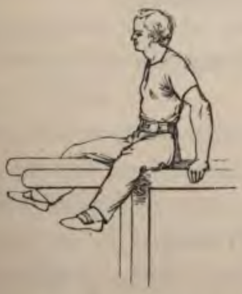
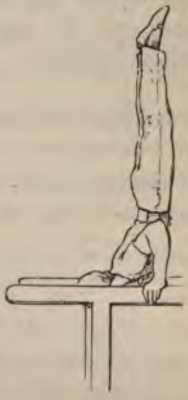


Fig. 30.



At the end of the bars, from the last rest, bring the lower limbs again between the bars, and shoot them out to the rear in the line of the bars, pushing strongly with the hands.

TO MARCH ABOVE THE BARS.

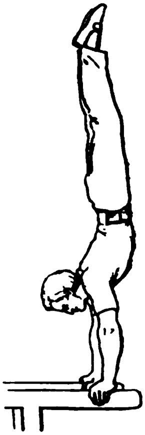
Third Series.
Exercise 28.
COURSE IV.

Position as in first exercise.

1. As in first exercise.
2. As in twentieth exercise to the elevation of the feet above the head (Fig. 31); retain the arms straight, advance the right hand six inches beyond the left, advance the left hand six inches beyond the right. Repeat.

At the end of the bars, carry the feet completely over the head to the ground, and descend yielding.

Fig. 31.



This exercise to be repeated backwards.

This exercise to be repeated with the arms bent, as in Fig. 30.

* * *

THE MOVEABLE PARALLEL BARS.

The exercises on this machine are as numerous as those on the fixed bars, but of a somewhat inferior order, although useful and interesting. They address themselves much more directly to the upper limbs, giving power and security to the grasp, and certainty and facility of action to the hand and arm. They divide themselves into three series, the first consisting of exercises executed *above* the bars, when low; the second, of those *under* the bars, when elevated to the reach of the hands, with or without oscillation; and the third, of those rising *between* the bars. The first is chiefly directed to the lower limbs; the second to the upper limbs alone; and the third to both. The first series may be performed also on the fixed bars, but as its exercises can be intensified or modified by the elevation or depression of the bars, they properly belong to this machine.

The position of the instructor should be on the right or left front of the learner.

This machine consists of two bars and tw osets of standards, in all respects the same as the Vaulting Bar and standards already described. The bars should be 22 inches apart, from centre to centre. Where there are Moveable Parallel Bars in a gymnasium, one of them is generally used for the Vaulting Bar, the other being temporarily removed.

FIRST SERIES...... *Over the bars.*
SECOND SERIES..... *Under the bars.*
THIRD SERIES ..... *Rising between the bars.*

TO CLEAR THE BARS, RESTING ON THE FIRST.

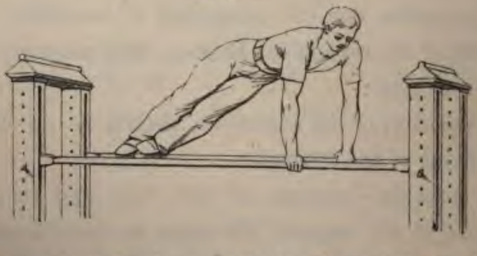
First Series.
Exercise 1.
COURSE I.

Position of attention, facing the bars.

1. Raise both hands and grasp the first bar, the hands at the distance, the fingers and thumb meeting, the feet immediately under the hands.

2. Spring from the ground to the right and rest with both feet on the first bar, and at the same time pass the right hand over to the second bar opposite the left (Fig. 1).

Fig. 1.



3. Press strongly from both hands and feet, clear the second bar, and descend yielding, facing the bars.

This exercise to be repeated on the left.

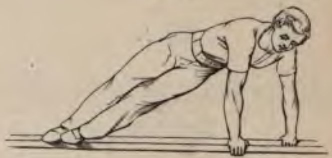
TO CLEAR THE BARS, RESTING ON THE SECOND.

First Series. Position as in first exercise.

Exercise 2. 1. As in first exercise.

COURSE I. 2. Spring from the ground to the right, clear the first bar, the lower limbs straight and together, and rest with both feet on the second bar, at the same time passing the right hand over to the second bar, opposite the left (Fig. 2).

Fig. 2.



3. Press strongly from both hands and feet, and descend yielding, facing the bars.

This exercise to be repeated on the left.

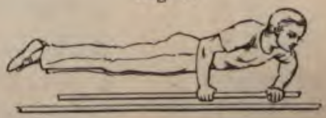
TO CLEAR THE BARS IN ONE MOVEMENT.

First Series. Position as in first exercise.

Exercise 3. 1. As in first exercise.

COURSE II. 2. Press from both hands and feet simultaneously, throw the lower limbs, straight and together, to the right (Fig. 3), clear both bars and descend yielding, facing the bars.

Fig. 3.



This exercise to be repeated on the left.

TO CLEAR THE FIRST BAR BY THE REAR AND THE SECOND BY THE FRONT.

First Series.
Exercise 4.
COURSE III.

Position as in first exercise.

1. As in first exercise.

2. Spring from the ground, throw the lower limbs in position to the right, and clear the first bar (Fig. 4), and at the instant of their elevation above the first bar, pass the right hand over to the second; let the lower limbs continue their fall between the bars and ascend in front (Fig. 5), clear the second bar, and descend yielding, in the line of the bars.

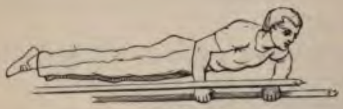


Fig. 4.

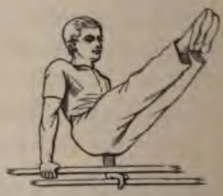


Fig. 5.

This exercise to be repeated on the left.

TO CLEAR BOTH BARS SEPARATELY BY THE REAR.

First Series.
Exercise 5.
COURSE III.

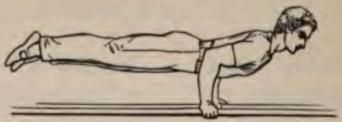
Position as in first exercise.

1. As in first exercise.

2. As in preceding exercise to the elevation of the lower limbs to the front after

clearing the first bar; from this point let the lower limbs fall again between the bars, return to the rear (Fig. 6), clear the second bar, and descend yielding, facing the bars.

Fig. 6.



This exercise to be repeated on the left.

TO PASS FROM THE FIRST TO THE SECOND BAR, THE RIGHT HAND LEADING.

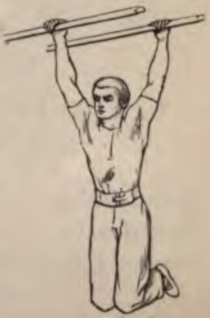
Second Series.
Exercise 6.
COURSE I.

Position as in first exercise.

1. Raise both hands and grasp the first bar, the hands at the distance, the fingers and thumbs together, sink to the full extension of the arms, bend the lower limbs, the knees in a line with the body, the feet behind, the head held back, the eyes directed to the reach of the hands.

2. Sustain the body in position, advance the right hand and grasp the second bar (Fig. 7), the left following; retake the grasp of the first bar with the left hand, the right following, replace the feet on the ground and rise to the first position.

Fig. 7.



This exercise to be repeated with the left hand leading.

TO PASS FROM THE FIRST TO THE SECOND BAR, CHANGING FRONT.

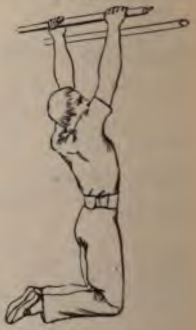
Second Series.
Exercise 7.
COURSE II.

Position as in first exercise.

1. As in sixth exercise.

2. As in sixth exercise, until both hands are on the second bar, quit the grasp with the right, swing on the left, pass under the bar, advance the right hand the distance beyond the left and grasp the bar (Fig. 8), changing front; reverse the grasp of the left hand, retaking the same part of the bar, advance the right hand again to the first bar, the left following, re-change the front, replace the feet on the ground and rise to the first position.

Fig. 8.



TO PASS FROM THE FIRST TO THE SECOND BAR, BOTH HANDS AT ONCE.

Second Series.
Exercise 8.
COURSE III.

Position as in first exercise.

1. As in sixth exercise, except that in lifting the feet from the ground, press slightly from the rear, causing a forward *oscillation*; augment the rearward return by the action of the *loins*, and on the forward return, as the feet come under

the bar, bend the arms and quit the grasp with both hands, and spring to the second bar; govern the forward oscillation and on the rearward return spring backwards to the first bar, replace the feet on the ground and rise to the first position.

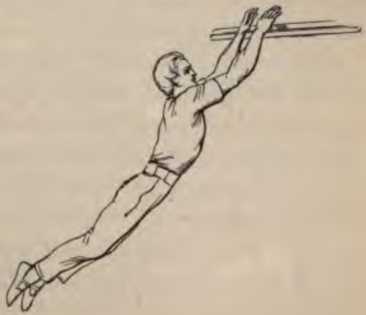
TO PASS FROM THE FIRST TO THE SECOND BAR, BOTH HANDS AT ONCE, CHANGING FRONT.

Second Series.
Exercise 9.
COURSE IV.

Position as in first exercise.

1. As in preceding exercise to the spring to the second bar; augment both the forward and the rearward oscillation, and on the return forward quit the grasp with both hands, rapidly change front (Fig. 9), and retake the bar, renew the oscillation, spring again to the first bar, again change front, replace the feet on the ground, and rise to the first position.

Fig. 9.



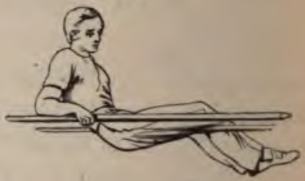
TO REST ON THE SINGLE BAR.

Third Series. Position of attention at the centre of
Exercise 10. the bars.

COURSE I. 1. Raise both hands and grasp the bars right and left, the fingers and thumbs meeting.

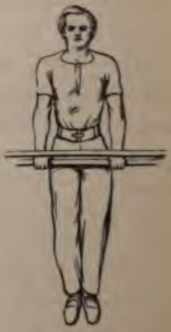
2. Lift both feet from the ground, and pass them over the left bar, resting on it under the knees, the head and shoulders held back, the trunk of the body sustained; quit the grasp of the left hand, retake it above the bar on the inside, at the same time elevating the elbow, and resting the fore-arm on the bar, the right following (Fig. 10); press from both hands to the full extension of the arms, and rise seated on the bar.

Fig. 10.



In descending, pass the right hand over to the left bar, reverse the grasp of the left, pass the right hand in front of the body and regrasp the bar at the distance beyond the left, at the same time quitting the seat and bringing the body round to front the bar (Fig. 11), slowly descend until the feet reach the ground, and quit the grasp of the hands.

Fig. 11.



This exercise to be repeated on the ight bar.

TO REST ON THE DOUBLE BARS.

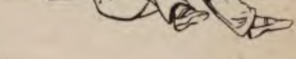
Third Series.
Exercise 11.
COURSE I.

Position as in tenth exercise.

1. As in tenth exercise.

2. Lift both feet from the ground, and pass them by the front over the bars, right and left; change and retake the grasp of the hands, as in tenth exercise (Fig. 12), and rise seated on the bars.

Fig. 12.



In descending, pass the right leg over to the left bar, and complete the descent as in tenth exercise.

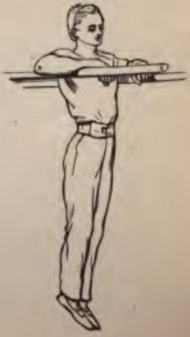
TO RISE BETWEEN THE BARS AND REST ON THE SINGLE BAR.

Third Series.
Exercise 12.
COURSE II.

Position as in tenth exercise.

1. Spring from the ground until the shoulders are above the bars, at the same time bringing the closed hands up to the breasts, spread out the folded arms horizontally, and by them rest on the bars, the chest advanced, the head held back, the lower limbs straight and together, the toes pointed to the ground (Fig. 13).

Fig. 13.



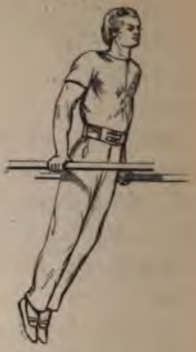
2. Grasp the bars right and left, press strongly from both hands, lean

forward, straighten the arms and rise above the bars resting on the hands (Fig. 14), elevate the lower limbs and pass them over the left bar, resting on it under the knees, and rise seated on the bar as in tenth exercise.

Descend as in tenth exercise.

This exercise to be repeated resting on the right bar.

Fig. 14.



TO RISE BETWEEN THE BARS AND REST ON BOTH.

Third Series.
Exercise 13.
COURSE II.

Position as in tenth exercise.

1. As in preceding exercise.

2. As in preceding exercise to the rest on the hands above the bars; elevate the lower limbs, pass one over each bar, and rise seated on the bar as in eleventh exercise.

In descending, rest strongly on the hands, raise the lower limbs, repass them over the bars, and bring them to the vertical line between the bars, the legs straight and together, the toes pointed to the ground, the column of the body upright, the head erect, the eyes directed to the front; quit the grasp of the hands, bring the arms close in by the sides, and descend yielding.

TO REST ON THE LEFT BAR AND CLEAR THE RIGHT, BY THE FRONT.

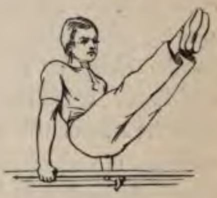
Third Series.
Exercise 14.
COURSE IV.

Position as in tenth exercise.

1. Spring from the ground until the breast is above the bars, seize both bars right and left, and immediately straighten the arms and come to the rest on the hands above the bars, elevate the lower limbs in position and pass them over the left bar, resting on it under the knees.

2. Press strongly with the hands, elevate the lower limbs in position above the bar, sweep them across and clear both bars to the right front (Fig. 15), quit the grasp, and descend yielding, in the line of the bars.

Fig. 15.



This exercise to be repeated, resting on the right bar and clearing the left.

TO RISE BY THE FIRST BAR AND DESCEND BY THE SECOND.

Third Series.
Exercise 15.
COURSE III.

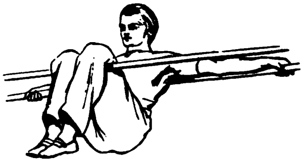
Position as in first exercise.

1. As in first exercise.

2. Lift both feet from the ground, and pass them over the second bar, resting on it under the knees, the fore-legs pendent, the trunk of the body sustained, the head held back; pass the head and

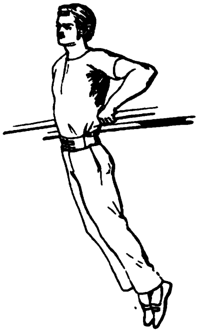
shoulders under the bar and rear them above it, resting on the back of the neck, quit the grasp of the right hand, bring the arm between the bars, and stretch it along the surface of the first bar, to the right, grasping the bar, the left hand following on the left bar (Fig. 16); gradually bring the hands together, along the bar, behind the back, and rise, seated on the second bar.

Fig. 16.



In descending, pass the right hand over to the second bar, the left following, reverse the grasp of both hands, elongate the trunk and lower limbs, setting the body free from the bar and resting sustained by the grasp of the hands in front of the bar (Fig. 17); gradually contract the arms, sink beneath the bar, and lower the feet to the ground.

Fig. 17.



THE TRAPEZIUM.

In importance this machine ranks with the fixed parallel bars, not so much on account of the number of its exercises as from their artistic character, and the power which they possess of testing and increasing the capacity of the trunk and upper limbs.

Every exercise on this machine consists of one or more evolutions of less or greater difficulty, of which the hand-grasp on the rope or the bar, or on both, forms the centre, the entire weight of the body and force of the movement being sustained by it. They all terminate on the spot, and in the position, in which they begin.

The exercises on this machine divide themselves into two series,—in those of the first, the *ropes* are grasped by either one or both hands; in those of the second, the ropes are carefully avoided and the grasp of the hands is on the *bar* alone.

From these two series a third is formed, consisting of certain of the exercises of each executed in *combination*; in one of these combinations, the entire second series can be executed without pause.

The whole of the exercises of the first series may be called double exercises, consisting of one evolution in ascending, and another in descending; those of the second series, with the exception of the last, are all complete circles in given positions.

All these exercises may be practised by beginners, the form of each, given in the text, being the perfect one, but capable of modification for initiatory practice. Thus in introducing a beginner to the first exercise, instead of grasping the rope a hand's-breadth above the bar, he may grasp it a foot or even more above the bar, the left hand following close under the right, and then day by day the space between the hands and the bar should be reduced, until these are placed as directed in the text. The same course may be literally followed in the second exercise. In the third and fourth, the initiatory practice may be accompanied by a spring from the ground, which should be gradually lessened until the effort falls entirely upon the upper limbs, as indicated in the text. In the fifth the limbs should be supported and guided by the instructor, this support being gradually withdrawn, until the learner can execute the movements without help.

The exercises of the second series are all arduous, but also admit of gradual approach. In the first, a slight spring may be taken, and both arms and legs allowed to remain bent; the spring may then be dis-ensed with; next, the legs may remain bent at the mmencement, and be extended during the rise; to be followed by the straight leg and bent arm, leading direct to the perfect exercise. In the second exercise the gradations by which it may be approached are less marked; it may be viewed as commencing where the second exercise in the first series terminates, and there is no intermediate practice; nothing but perseverance against repeated failures will overcome the difficulty, for the position is not such as will admit of direct help from the instructor, and all that can be given in this exercise must be but the steadying of the limbs, enabling the learner to hold his own. The fourth and fifth exercises have no gradations on this machine, but may be approached here by practice on others, where, on account of such machines being fixed and firm, they are less difficult. The sixth may be approached by practice on a machine that turns with the hand, such as the Pair of Rings. The seventh is always found to be one of the most difficult on this machine, and requires the greatest care in its execution; the pause in the horizontal line should never exceed a few seconds. The variation of this exercise sometimes performed, of passing from the horizontal line over the bar in position, should never be allowed, as it is in the highest degree dangerous.

The best grasp for the instructor in directing the evolutions on the trapezium is a firm hold of the wrist with the left hand, the right firmly grasping the leg of the trowsers at the ankle.

The position of the instructor should be on the right or left of the machine, facing the learner.

The bar of the trapezium should be 2 feet 6 inches long and 1½ inch in diameter, and suspended at a height of 4 feet 6 inches from the floor.

FIRST SERIES ......*By the ropes.*
SECOND SERIES ....*By the bar.*
THIRD SERIES .....*Combinations.*

TO RISE BY THE SINGLE ROPE.

First Series.
Exercise 1.
COURSE I.

Position of attention, the trapezium in profile on the left.

1. Raise the right hand and grasp the rope a hand's-breadth above the bar, the left following in the interspace (Fig. 1).

Fig. 1.

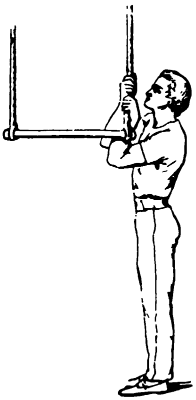


Fig. 2.

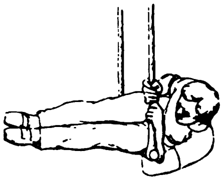
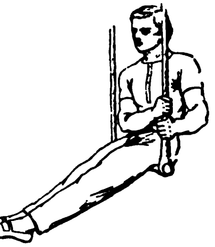


Fig. 3.



2. Lift both feet from the ground, the legs straight and together, the toes pointed to the front, and pass them over the bar, elevating the body until the hip rests on its surface (Fig. 2); press downwards with the hands and rise seated on the bar, retaining the grasp of the rope (Fig. 3).

In descending, lean slowly backwards and sidewards, bringing the hip again on the bar, remove the lower limbs from it, and come to the first position.

This exercise to be repeated with the trapezium on the right, the left hand uppermost.

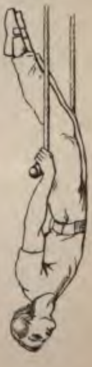
TO RISE BY BOTH ROPES.

First Series.
Exercise 2.
COURSE I.

Position of attention, facing the trapezium.

1. Raise both hands and grasp the ropes, one in each hand, close to the bar.

Fig. 4.



2. Lift both feet from the ground, and pass them under the bar between the hands, at the same time allowing the head and shoulders to fall backwards and straightening the arms; and by a continuous movement bend the back inwards, and extend the lower limbs upwards (Fig. 4), bending the arms until the hips are as high as the bar; slowly let the feet descend to the front, and at the same time and at the same pace let the trunk, shoulders, and head ascend, and come to the seat on the bar, retaining the grasp. During this last movement let the chin be

elevated, the shoulders pressed back, the breast advanced square to the front.

In descending, lower the body from the bar backwards, let the lower limbs fall to the rear, repass the feet under the bar, and come to the first position.

TO RISE BY THE BACK LIFT.

First Series.
Exercise 3.
COURSE I.

Position as in second exercise.

1. Raise the right hand to the reach and grasp the rope, raise the left hand and grasp the bar at its centre.

2. Lift both feet from the ground, the toes pointed downwards, by the flexion of the right arm and the extension of the left, and rise until the face is as high as the right hand, the left arm straight above the hand grasping the bar (Fig. 5); turn to the right, the back to the bar, and sit in the space between the left hand and the right rope (Fig. 6), retaining the grasp.

Fig. 5.

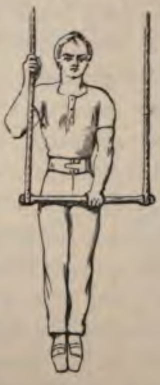
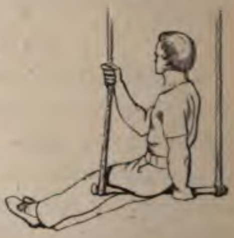


Fig. 6.



In descending raise the body and return the face to the bar, lower the body slowly to the ground.

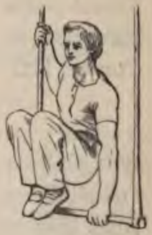
This exercise to be repeated with the left hand on the rope.

TO RISE BY THE FRONT LIFT.

First Series. Position as in second exercise.
Exercise 4. 1. As in third exercise.
COURSE II. 2. As in third exercise until the left arm is straight above the bar,

Fig. 5; raise the feet and pass them over the bar through the space between the left hand and the right rope (Fig. 7), extend the legs, point the toes to the front, and come to the seat on the bar, retaining the grasp.

Fig. 7.



In descending, withdraw the feet through the interspace, and slowly lower them to the ground.

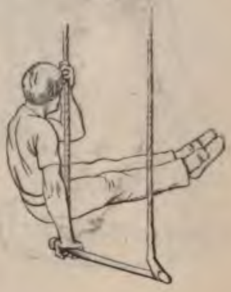
This exercise to be repeated with the left hand on the rope.

TO TURN ROUND THE ROPES, RIGHT AND LEFT.

First Series. Position as in second exercise.
Exercise 5. 1. As in third exercise.
COURSE II. 2. As in fourth exercise to the seat on the bar.

3. Raise the left hand from the bar and grasp the right rope as high as the face, slip the right hand down to the bar, and grasp it close to the rope with the thumb to the front, the fingers to the rear; lift the body from the bar, pass round the outside of the right rope, the feet leading (Fig. 8), pass the

Fig. 8.



lower limbs between the ropes, and again come to the seat on the bar.

4. Repeat the movement round the left rope, reversing the respective positions of the hands.

Descend as in fourth exercise.

TO TURN ROUND THE BAR FORWARDS.

Second Series.
Exercise 6.
COURSE III.

Position as in second exercise.

1. Raise both hands and grasp the bar, the hands at the distance, the backs of the hands upwards, the fingers and thumbs meeting; extend the lower limbs to the front, at the same time sinking to the reach of the hands; the legs together and straight, the feet together with the toes pointed to the front (Fig. 9).

2. Lift the feet from the ground, the lower limbs in

Fig. 9.

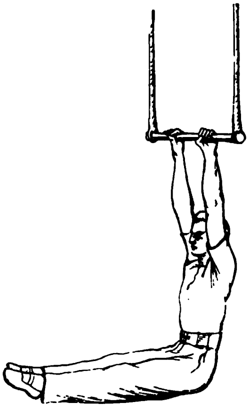


Fig. 10.

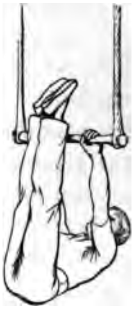
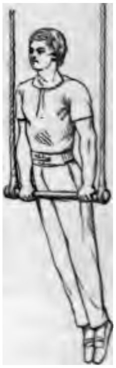


Fig. 11.



position, the arms remaining perfectly straight, until the feet are as high as the bar (Fig. 10); bend the arms, and at the same time elevate the body until the waist is as high as the bar, pass the lower limbs over the bar, the trunk following, revolving on the waist (Fig. 11), lower the body, completing the circle, and slowly descend until the feet meet the ground; relinquish the grasp of the hands.

TO TURN ROUND THE BAR BACKWARDS.

Second Series.
Exercise 7.
COURSE III.

Position as in second exercise.

1. As in sixth exercise.

2. As in sixth exercise until the feet are as high as the bar (Fig. 10); pass the feet under the bar between the hands, and by a continuous movement bend the back inwards and extend the lower limbs upwards, bending the arms until the waist is as high as the bar (Fig. 12), let the lower half of the body slowly fall to the front, and as it descends let the upper half ascend in position, the head well thrown back, and sink slowly down, the back touching the bar (Fig. 13), until the feet meet the ground; relinquish the grasp of the hands.

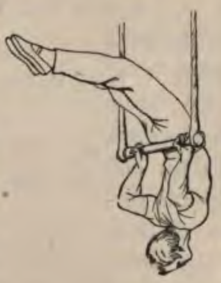


Fig. 12.

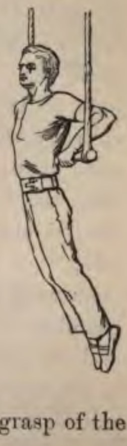


Fig. 13.

TO TURN ROUND THE BAR BACKWARDS, AND RETURN.

Second Series.
Exercise 8.
COURSE III.

Position as in second exercise.

1. As in sixth exercise.

2. As in preceding exercise to its completion, but at this point, instead of relinquishing the grasp, press from the hands, straighten the arms, bending the back inwards, and rise to the seat on the bar; slowly let the head and shoulders fall to the rear, re-pass the feet under the bar, straighten the legs, lower the body, and return to the first position.

TO RISE ABOVE THE BAR, RIGHT AND LEFT.

Second Series.
Exercise 9.
COURSE III.

Position as in second exercise.

1. As in sixth exercise.

2. Lift both feet from the ground, bend the arms until the breast is as high as the bar, press strongly with the right hand upon the bar and raise the fore-arm vertically above it (Fig. 14); repeat the movement with the left hand, complete the extension of both arms, and come to the upright position, resting on the bar (Fig. *15*).

Fig. 14.

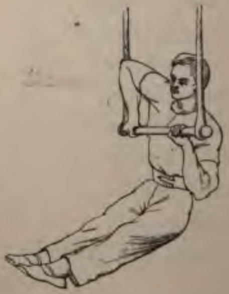
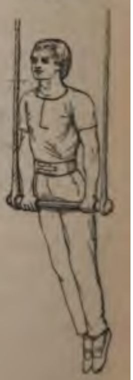


Fig. 15.



In descending, re-bend the right arm, and pass it below the bar, the left following, lower the body and come to the first position.

This exercise to be repeated left and right.

TO RISE ABOVE THE BAR, BOTH HANDS AT ONCE.

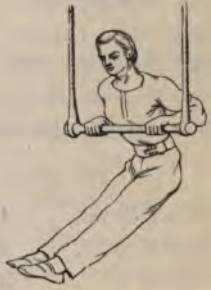
Second Series.
Exercise 10.
COURSE IV.

Position as in second exercise.

1. As in sixth exercise.

2. Lift both feet from the ground, bend the arms until the breast is as high as the bar, press strongly upon the bar with both hands at once and rise above it (Fig. 16), completing the extension of the arms, and come to the upright position, resting on the bar, as in Fig. 15.

Fig. 16.



This series of movements to be executed without pause, and at the same pace throughout.

In descending, re-bend the arms, pass them below the bar, and come to the first position.

TO TURN UNDER THE BAR ON ONE HAND.

Second Series.
Exercise 11.
COURSE IV.

Position as in second exercise.

1. As in sixth exercise.

2. As in sixth exercise, until the feet are as high as the bar (Fig. 10); pass the feet

Fig. 17.

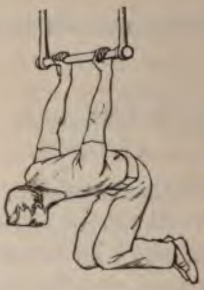
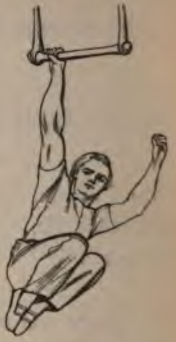


Fig. 18.



under the bar between the hands, and let them descend close to the ground, but without touching it (Fig. 17); quit the grasp of the left hand, at the same time folding the lower limbs close under the body, and swinging round by the right, make a complete turn laterally, and again come to the front (Fig. 18), re-grasp the bar with the left hand, extend the legs, again raise the feet to the bar and re-pass them under it, quit the grasp with the right hand, swinging round by the left, re-grasp the bar with the right hand, extend the legs and come to the first position.

TO FORM THE STRAIGHT LINE.

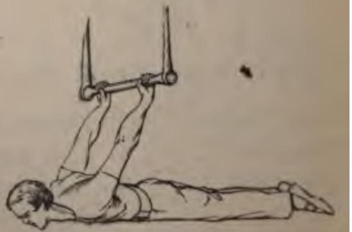
Second Series.
Exercise 12.
COURSE IV.

Position as in second exercise.

1. As in sixth exercise.

2. As in preceding exercise until the feet are passed under the bar; at this point extend the legs to the rear and pause, forming a perfectly horizontal line from head to t, suspended by the

Fig. 19.



arms under the bar (Fig. 19); relax the extension, re-pass the feet under the bar, extend the legs to the front, and come to the first position.

THIRD SERIES. COMBINATIONS.

The following exercises should be combined and executed without pause, as soon as the separate exercises composing them can be performed singly.

COMBINATIONS OF TWO EXERCISES.

Nos. 2–5. To rise by both ropes—to turn round the ropes, right and left.

Nos. 4–5. To rise by the front lift—to turn round the ropes, right and left.

Nos. 6–8. To turn round the bar forwards—to turn round the bar, backwards and return.

Nos. 6–10. To turn round the bar forwards—to rise above the bar, both hands at once.

Nos. 6–11. To turn round the bar forwards—to turn under the bar on one hand.

Nos. 6–12. To turn round the bar forwards—to form the straight line.

Nos. 8–10. To turn round the bar backwards and return—to rise above the bar, both hands at once.

Nos. 8–11. To turn round the bar backwards and return—to turn under the bar on one hand.

Nos. 8–12. To turn round the bar backwards and return—to form the straight line.

Nos. 10–11. To rise above the bar both hands at once—to turn under the bar on one hand.

Nos. 11–12. To rise above the bar both hands at once—to form the straight line.

COMBINATIONS OF THREE EXERCISES.

Nos. 6–8–10. To turn round the bar forwards—to turn round the bar backwards and return—to rise above the bar, both hands at once.

Nos. 6–10–11. To turn round the bar forwards—to rise above the bar, both hands at once—to turn under the bar on one hand.

Nos. 6–10–12. To turn round the bar forwards—to rise above the bar both hands at once—to form the straight line.

Nos. 6–11–12. To turn round the bar forwards—to turn under the bar on one hand—to form the straight line.

Nos. 10–8–12. To rise above the bar both hands at once—to turn round the bar backwards and return—to form the straight line.

Nos. 8–11–12. To turn round the bar backwards and return —to turn on one hand under the bar—to form the straight line.

Nos. 8–11–10. To turn round the bar backwards and return —to turn under the bar on one hand—to rise above the bar both hands at once.

COMBINATIONS OF FOUR EXERCISES.

Nos. 6–8–10–11. To turn round the bar forwards—to turn round the bar backwards and return—to rise above the bar both hands at once —to turn under the bar on one hand.

Nos. 6–10–11–12. To turn round the bar forwards—to rise above the bar both hands at once—to turn under the bar on one hand—to form the straight line.

Nos. 8–10–6–12. To turn round the bar backwards and return—to rise above the bar both hands at once—to turn round the bar forwards—to form the straight line.

Nos. 10–8–11–6. To rise above the bar both hands at once —to turn round the bar backwards and return—to turn under the bar on one hand—to turn round the bar forwards.

COMBINATIONS OF FIVE EXERCISES.

Nos. 6–8–10–11–12. To turn round the bar forwards—to turn round the bar backwards and return—to rise above the bar both hands at once—to turn under the bar on one hand—to form the straight line.

Nos. 8–10–6–11–12. To turn round the bar backwards and return—to rise above the bar both hands at once—to turn round the bar forwards—to turn under the bar on one hand—to form the straight line.

Nos. 10–8–6–10–12. To rise above the bar both hands at once—to turn round the bar backwards and return—to turn round the bar forwards—to rise above the bar both hands at once—to form the straight line.

* * *

THE PAIR OF RINGS.

This machine is similar in character to the trapezium, giving a wide course of exercises, passing from the most simple to the most arduous. Like the exercises of the trapezium, they powerfully address themselves to the trunk, especially its upper region, and to the arms. They all terminate on the spot, and in the position, in which they begin. They also may be divided into two series, although these are not so clearly defined as those of the first-named machine; the first series comprises all exercises of *evolution*, single or double, with arms bent or straight; the second, all those *rising to*, or *above* the rings.

With this machine also, the exercises are all given in the text in their perfect form, and allow of gradual approach through less difficult movements and positions. The first and second may be begun not only while standing upright and with the arms bent, but a spring may be taken with the feet to assist in the elevation of the lower limbs, and the knees may remain bent both in the ascent and descent, to front and rear; these modifications of the exercise being gradually relinquished as the body acquires strength, until it can be executed in its perfect form. The first part of the third exercise may be similarly modified, but its distinguishing feature, that of turning the body while the feet remain in the rings, must always be executed slowly, the back sinking gradually, with every joint of the spine sharing equally in the depression, and the chest gradually rounding and expanding under the same influence.

In the second series, the first, second, and third exercises lead direct to each other, and these may be modified, first, by being begun from the erect standing position, and next from the kneeling position.

The last exercise is very difficult, and the same care and restrictions which are directed for the corresponding one on the trapezium are necessary here.

In all evolutions on this machine the instructor should grasp the right wrist of the learner with one hand, and as soon as the feet have passed the rings, he should with the other govern the lower limbs in their descent. While the body is turning with the feet in the rings, the instructor should pass his left arm under the waist of the learner to limit the extent of its descent, always retaining his grasp of the wrist. In the turn with the hands (right and left) the instructor should grasp the right wrist of the learner, and gradually lower him until his entire weight is on the left, and *vice versâ*, always grasping the hand that is to relinquish the hold of the ring.

The position of the instructor should be the same as with the trapezium.

The Pair of Rings should be 5 inches in diameter, fixed 18 inches apart, and suspended at a height of 5 feet 6 inches from the floor.

FIRST SERIES. ..... *Evolutions.*
SECOND SERIES .... *Rising between the rings.*
THIRD SERIES...... *Combinations.*

THE SINGLE CIRCLE.

First Series.
Exercise 1.
COURSE I.

Position of attention, between the rings.

1. Raise both hands and grasp the rings, one in each hand, lower the body to the reach of the hands and pass both feet to the front, the legs together and straight, the feet together, the toes pointed to the front (Fig. 1).

2. Lift both feet from the ground, and pass them between the rings, the arms and legs straight throughout (Fig. 2); slowly descend to the ground, completing the circle (Fig. 3), and relinquish the grasp.

Fig. 1.

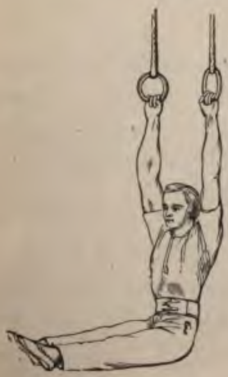


Fig. 2.

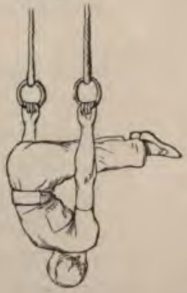
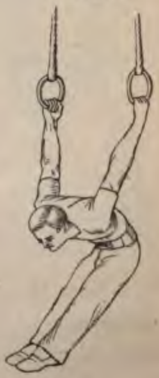


Fig. 3.



THE DOUBLE CIRCLE.

First Series.
Exercise 2.
COURSE I.

Position as in first exercise.

1. As in first exercise.

2. As in first exercise to the completion of the single circle, but instead of relinquishing the grasp of the hands, return between the rings and come to the first position, retaining the arms and legs straight throughout. Bend the arms, replace the feet upon the ground under the rings, and quit the grasp.

TO TURN WITH THE FEET IN THE RINGS.

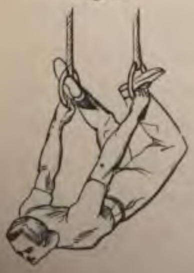
First Series.
Exercise 3.
COURSE I.

Position as in first exercise.

1. As in first exercise.

2. As in first exercise to the half-circle (the feet between the rings), separate the feet right and left and insert each in its respective ring.

Fig. 4.



3. Resume with the trunk of the body the action of the circle, slowly separating the knees, lowering and arching the back and raising the head (Fig. 4).

4. Re-raise the trunk to its position at the half-circle, remove the
t from the rings, straighten the legs, point the toes up-
s and let them gradually descend to the front, the arms
ht, and come to the first position.

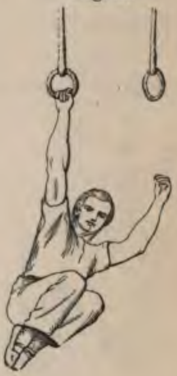
TO TURN ON ONE HAND RIGHT AND LEFT.

First Series. Position as in first exercise.
Exercise 4. 1. As in first exercise.
COURSE III. 2. As in first exercise to the completion of the single circle, but instead of relinquishing the grasp with both hands, retain the grasp of the right, passing the left arm down by the side, and folding the lower limbs under the body.

3. Make a complete turn laterally from left to right, re-grasp the ring with the left hand (Fig. 5), and extend the lower limbs to the front as in first position.

4. Re-pass the feet between the rings, repeat the turn from right to left retaining the grasp of the left hand, re-grasp the ring with the right, extend the lower limbs to the front and come to the position.

Fig. 5.



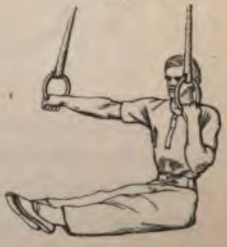
TO EXTEND THE ARMS RIGHT AND LEFT.

Second Series. Position
Exercise 5. as in
COURSE II. first exercise.

1. As in first exercise.

2. Bend the arms until the hands are at the rest, raising the lower limbs in position; sustain the body on the left

Fig. 6.



hand (retaining it close by the side), extend the right arm holding the ring at the full length of the arm (Fig. 6), pause, and return the right hand to the side; repeat the extension with the left arm, pause, return it to the side, lower the body and come to the position.

TO RISE ABOVE THE RINGS RIGHT AND LEFT.

Second Series.
Exercise 6.
COURSE III.

Position as in first exercise.

1. As in first exercise.

2. Bend the arms until the hands are at the rest, raising the lower limbs in position, press strongly on the ring with the right palm, raising the fore-arm vertically above the ring (Fig. 7), repeat the movement on the left, press strongly with both hands, straighten the arms completely above the rings and pause (Fig. 8); the chest fully advanced, the head held back, the chin elevated, the legs straight and together, the toes pointed to the ground.

Fig. 7.

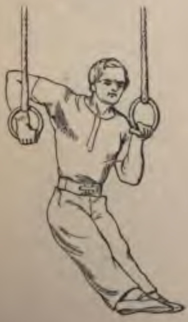
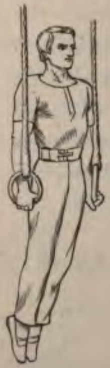


Fig. 8.



In descending, re-bend the right arm, the left following, re-pass the right below the ring, the left following, lower the body and come to the position.

This exercise to be repeated with the left hand leading.

TO RISE ABOVE THE RINGS BOTH HANDS AT ONCE.

Second Series.
Exercise 7.
COURSE IV.

Position as in first exercise.

1. As in first exercise.

2. As in preceding exercise until the hands are at the rest, instantly press strongly on the rings with both hands, and raise both arms vertically above the rings (Fig. 9), and rise above the rings to the full extension of the arms (Fig. 10); thetransition from the bent to the extended position of the arms taking place without pause.

Fig. 9.

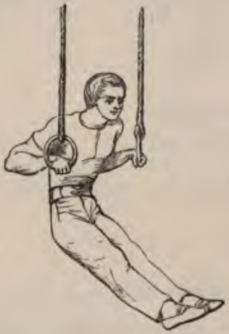
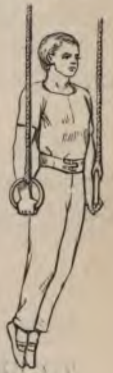


Fig. 10.



In descending, rebend both arms at once, pass them below the rings, lower the body and come to the position.

TO RISE ABOVE THE RINGS BACKWARDS, RIGHT AND LEFT.

Second Series.
Exercise 8.
COURSE IV.

Position as in first exercise.

1. As in first exercise.

2. As in first exercise to the completion of the single circle; elevate the right side,

lean slightly forward, press strongly with the right hand, and raise the fore-arm vertically above the ring (Fig. 11), repeat the movement on the left, press strongly with both hands, and rise above the rings as in seventh exercise (Fig. 12).

Descend as in seventh exercise.

This exercise to be repeated with the left hand leading.

Fig. 11.

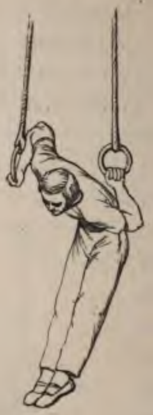
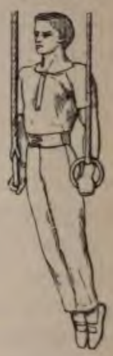


Fig. 12.



TO RISE ABOVE THE RINGS BACKWARDS, BOTH HANDS AT ONCE.

Second Series.
Exercise 9.
COURSE IV.

Position as in first exercise.

1. As in first exercise.

2. Lift both feet from the ground and pass them between the rings, and at the e time rapidly bend the arms, raising the body between ings until the hands are close at the sides, instantly press oth hands and raise the fore-arms vertically above the Fig. 13), straighten the arms, continue the movement

of the circle with the lower limbs, and let the body rise between the rings in the position of seventh exercise (Fig. 14).

Fig. 13.

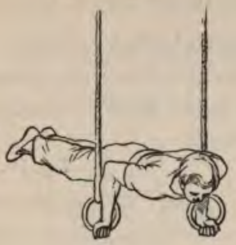
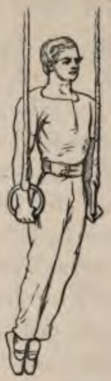


Fig. 14.



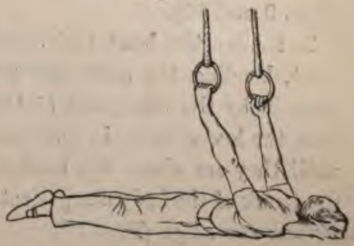
TO FORM THE STRAIGHT LINE BACKWARDS.

Second Series. Position as in first exercise.
Exercise 10. 1. As in first exercise.
COURSE IV. 2. As in first exercise to the half circle (Fig. 2),

but instead of lowering the feet to the ground, extend them to the rear until the lower limbs and trunk form one perfect horizontal line (Fig. 15).

Relax the extension of

Fig. 15.



the lower limbs, let the feet descend to the rear, and come to the position.

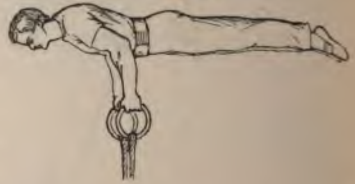
TO FORM THE STRAIGHT LINE FORWARDS.

Second Series.
Exercise 11.
COURSE IV.

Position as in first exercise.

1. Raise both hands and grasp the rings; raise the lower limbs to the front in position, the toes pointed to the front, and allowing the head and shoulders to fall to the rear, the arms slightly bent, until the lower limbs and trunk form one perfect horizontal line (Fig. 16).

Fig. 16.



Relax the extension, let the feet descend to the ground, and come to the position.

TO STAND ABOVE THE RINGS.

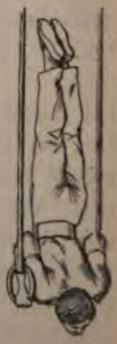
Second Series.
Exercise 12.
COURSE IV.

Position as in first exercise.

1. Rise above the rings as in seventh exercise (Figs. 9 and 10).

2. Incline the head and shoulders to the front, bending the arms and pressing them lose in by the sides, and at the same time the lower limbs in position by the rear hey are above the head, forming with k of the body one perfect vertical line the rings (Fig. 17).

Fig. 17.



Relax the extension, bring the lower limbs down by the front to the ground, and come to the position.

TO STAND BELOW THE RINGS.

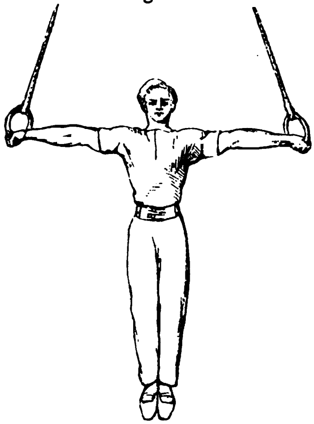
Second Series.
Exercise 13.
COURSE IV.

Position as in first exercise.

1. Rise above the rings as in seventh exercise (Figs. 9 and 10).

2. Slowly let the whole body descend in position between the rings, at the same time extending the arms perfectly straight right and left, strongly pressing downwards with the palms, until the arms are at right angles with the body (Fig. 18); relax the extension and slowly lower the feet to the ground, and come to the position.

Fig. 18.



* * *

THIRD SERIES.

COMBINATIONS.

When all or most of these exercises can be performed singly, two, three, or more of them should be combined and executed without pause. The following are some of the combinations which may be made, and others can be formed at discretion.

COMBINATIONS OF TWO EXERCISES.

Nos. 2–3.	The double circle—to turn with the feet in the rings.
Nos. 2–4.	The double circle—to turn on one hand right and left.
Nos. 2–6 or 7.	The double circle—to rise above the rings backwards.
Nos. 2–8.	The double circle—to rise above the rings.
Nos. 2–10.	The double circle—to form the straight line backwards.

COMBINATIONS OF THREE EXERCISES.

Nos. 2–4–5.	The double circle—to turn on one hand right and left—to extend the arms right and left.
Nos. 2–7–4.	The double circle—to rise above the rings—to turn on one hand right and left.
Nos. 2–8–7.	The double circle—to rise above the rings backwards—to rise above the rings both hands at once.
s. 2–7–12.	The double circle—to rise above the rings both hands at once—to form the straight line above the rings.

COMBINATIONS OF FOUR EXERCISES.

Nos. 2–7–4–10. The double circle—to rise above the rings both hands at once—to turn on one hand right and left—to form the straight line.

Nos. 2–7–12–3. The double circle—to rise above the rings both hands at once—to form the straight line above the rings—to turn with the feet in the rings.

Nos. 7–12–2–10. To rise above the rings—to form the straight line above the rings—the double circle—to form the straight line backwards.

COMBINATIONS OF FIVE EXERCISES.

Nos. 2–7–4–10–12. The double circle—to rise above the rings both hands at once—to turn on one hand right and left—to form the straight line backwards—to form the straight line above the rings.

Nos. 7–12–3–5–11. To rise above the rings both hands at once—to form the straight line above the rings—to turn with the feet in the rings—to extend the arms right and left—to form the straight line forwards.

THE ROW OF RINGS.

THE single exercise on this machine is a very simple one, and if the proper elevation of the rings from the floor be preserved, it may be safely practised without supervision, or at most with that of a monitor. It is not the less valuable on this account, but, on the contrary, it has a special object which it shares with the exercises of the next machine, viz. the equalization in strength and development of the two sides of the upper half of the body, and of the arms; for it necessitates that only one side can work at a time, and that the amount of exertion will be the same for each side, and that therefore the weaker side will actually do more, being the weaker, and consequently by the unerring law of development being in relation to activity, it will in time overtake and rank with its fellow in development and capacity.

The row of rings should consist of not less than five or six rings similar to those described for the preceding machine, and there may with advantage be a greater number, if the length of the gymnasium will admit of it. They should be suspended at a height of not less than 6 feet 3 inches from the floor, and at equal distances apart, the distances in each case depending on the facilities offered by the building for attaching the ropes; but the distance apart should not be less than 8 feet or more than 10 feet, and the point to which the ropes are hung should never exceed 20 feet above the floor.

SINGLE SERIES.

THE SWING.

Single Series.
Single Exercise.
COURSE II.

Position of attention, facing the first ring, the back to the row.

1. Raise the left hand and grasp the ring (Fig. 1), advance with short and rapid steps and springing from the ground at the end of the run, from the left foot, turn quickly to the right, bending the lower limbs at the knees and pointing the toes

Fig. 1.

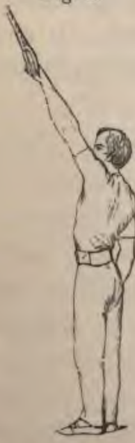
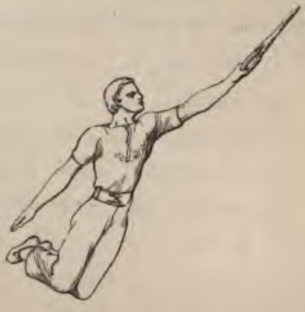
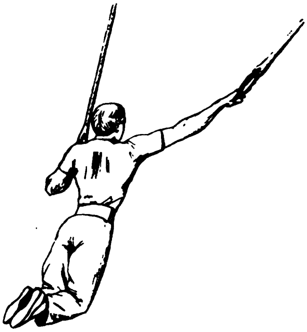


Fig. 2.



to the rear, the head erect, the breast advanced (Fig. 2); on approaching the second ring extend the right hand and grasp it, and, while retaining it lightly in the hand, return to the farthest point of the backward oscillation on the ring grasped by the left (Fig. 3); at this point quit the grasp of the left, withdrawing the hand lightly and leaving the ring motionless, turn to the right and bring the left hand in a full sweep round by the thigh, the arm quite straight and fingers pointed downwards, describing a half circle in the sweep, extend it to the front, and grasp the next ring. Repeat. On grasping the last ring turn quickly round, facing the row, and descend yielding.

Fig. 3.



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THE ELASTIC LADDER.

The exercises on this machine resemble in character that on the row of rings, and have the same object, i. e. the equalization of the arms and upper part of the body; they are two in number, the second being but a more advanced and dexterous mode of performing the first. They are several degrees more difficult than that on the row of rings, the machine being firm, and the whole weight of the descent in the oscillation coming upon the sustaining hand. They are, however, always favourites, and when the ladder is well arranged and perfectly secure in its vertical straps and horizontal fastenings, and a class of men pass along it, each taking the spar as it is relinquished by his predecessor, there is no more effective exercise in the Gymnasium.

Short distances, consisting of a few spars only, should be attempted at first, and with beginners only one should be passed along the ladder at a time, the instructor walking by his side, giving directions and explanations as each step is made.

The elastic ladder should be suspended at a height of 8 feet 6 inches from the floor; the width of the ladder should be 15 inches, the spars 9 inches apart. It may be of any length beyond 30 feet.

SINGLE SERIES.

THE SINGLE STEP.

Single Series.
Exercise 1.
COURSE III.

Position of attention under the lad facing the standard.

1. Ascend to the step and with the rig hand grasp the first spar, the fingers a thumb meeting, face to the left, lean forward, fully exten the left arm and grasp the spar nearest the hand, the pal facing the range of the ladder (Fig. 1).

2. Lift both feet from the step, and in their fall let them swing as far as the advanced hand, the head erect, the legs straight and together, the toes pointed to the ground; on the return oscillation towards the right, quit the grasp with the right hand, and bring it in full sweep (the arm

Fig. 1.

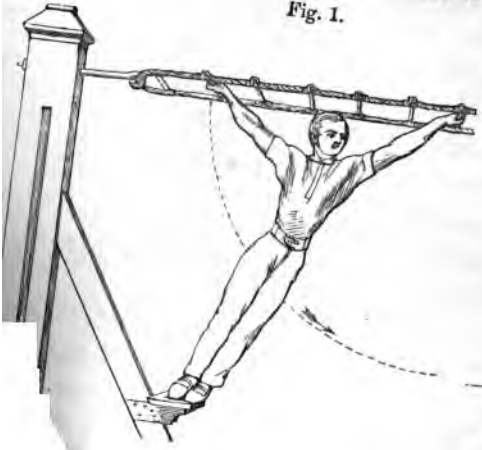
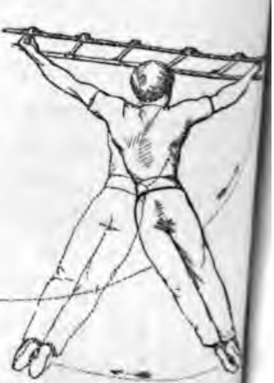


Fig. 2.



quite straight) round by the thigh (the body turning at the same time), extend it to the front and grasp the nearest spar (Fig. 2); again let the trunk and lower limbs fall to the rear until they are under the left hand (as shown by dotted lines on Fig. 2), quit the grasp with the left hand, pass it round by the thigh (the body turning), and complete the movements of the step. Repeat.

At the completion of the last step, steady the body, bring it to the vertical position, quit the grasp with both hands, and descend yielding.

THE DOUBLE STEP.

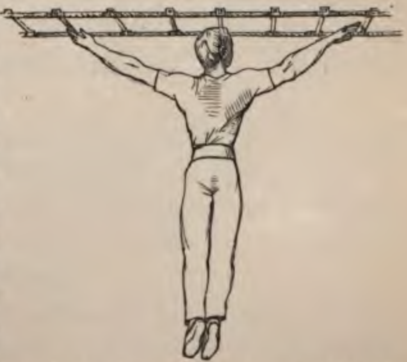
Single Series.
Exercise 2.
COURSE IV.

Position as in preceding exercise.

1. As in preceding exercise.

2. As in preceding exercise to the forward oscillation, but instead of retaining the grasp of the left hand while the right passes to another spar, quit the grasp of the left (Fig. 3), thus allowing the forward oscillation to enable the right hand to grasp a spar in advance of that which it could have grasped had the left retained its hold; the

Fig. 3.



exercise thus consisting of a succession o pause, only one hand ever being on the lad and towards the terminating movement of hands being free (Fig. 3). Repeat.

On grasping the last spar, sweep the rapidly round by the thigh, make a com the body, quit the grasp and descend yieldin

* * *

THE HORIZONTAL BAR.

The exercises on this machine are very valuable, for two distinct reasons; first, from their own intrinsic value; second, from the circumstance that they are capable of being executed by an entire class at the same time, all obeying the same word of command. They naturally divide themselves into two series, the first consisting of all those *on* the bar in its natural form, ranking in character and value with those of the two last-mentioned machines; the second, of all those in which the body is elevated *up to* and *above* the bar, by the flexion and extension of the arms; the learner rising either on the side on which he began the exercise, or passing round the bar by the action of the trunk, and resting on its surface. These resemble in nature and purpose certain exercises of the second series on the trapezium.

As is always the case with exercises performed by a number of men at the same time, a stricter discipline must be preserved, with a closer observance of time. The more complex exercises should all be practised by the learners separately.

The position of the instructor should vary. In the first series it should be as with the last two machines; in the second series, as with the corresponding exercises on the trapezium, except when executed by a class, when it should be to the front, and opposite the centre of the bar.

The horizontal bar should be of wrought iron $1\frac{1}{2}$ inch in diameter, and fixed at a height of 8 feet from the floor. It may be of any length beyond 20 feet.

FIRST SERIES ..... *Travelling.*
SECOND SERIES .... *Rising to and above the Bar.*

RIGHT HAND LEADING.

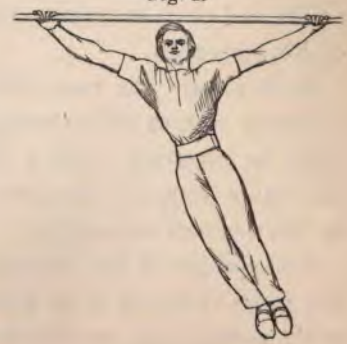
First Series.
Exercise 1.
COURSE I.

Position of attention facing the bar.

1. Spring from the ground and grasp the bar, the hands at the distance, the fingers and thumbs together, the arms straight, the trunk of the body upright, the legs straight and together, the feet together, the toes pointed to the ground.

2. Advance the right hand to its farthest reach along the bar, at the same time passing the lower limbs in position to the left until the feet are under the left hand (Fig. 1); quit the grasp of the left hand and immediately *pass* it along the bar to

Fig. 1.



the right, at the same time allowing the lower limbs and trunk to swing to the right until they are under the right hand, again advance the right hand to the reach and repeat the movements of the step. Repeat.

On the completion of the last step, resume the first position, quit the grasp with both hands, and descend yielding.

This exercise to be repeated with the left hand leading.

RIGHT AND LEFT.

First Series.
Exercise 2.
COURSE II.

Position as in first exercise.

1. As in first exercise.

2. Advance the right hand to its farthest reach along the bar, at the same time pass the lower limbs in position to the left until the feet are under the left hand (Fig. 2), quit the grasp of the left hand,

Fig. 2.

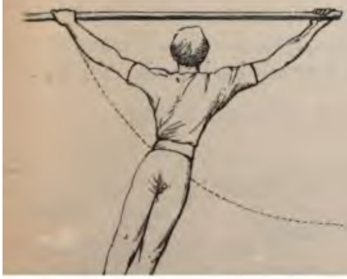
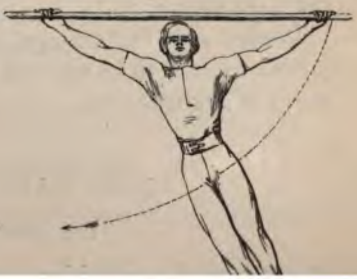


Fig. 3.



letting the body and lower limbs fall to the left, let the left hand sweep round by the thigh in a half circle, and grasp the bar at a full reach beyond the right, at the same time making a complete turn with the body, and continuing the oscillation of the lower limbs until the feet are under the left hand (Fig. 3). Again pass the lower limbs to the left, quit the grasp of the right hand, and complete the movements of the step. Repeat.

Descend as in first exercise.

RIGHT AND LEFT, BACKWARDS.

First Series. Position as in first exercise.
Exercise 3. 1. As in first exercise.
COURSE II. 2. Advance the right hand to its farthest reach along the bar, quit the grasp of the left hand, but instead of passing it round by the front, as in preceding exercise, let it fall by the rear and grasp the bar at the full reach beyond the right, the body making a complete turn backwards during the step. Repeat with the left and right alternately.

Descend as in first exercise.

This exercise to be repeated turning backwards and forwards at alternate steps.

RIGHT HAND LEADING.

(THE ARMS BENT.)

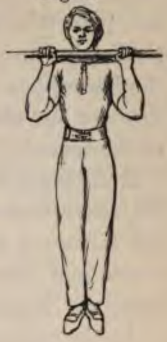
First Series. Position as in first exercise.
Exercise 4. 1. As in first exercise.
COURSE II. 2. Bend the arms to the half reach, the

chin rising above the bar (Fig. 4), advance the left hand up to the right, advance the right the distance of the step, retaining the trunk and lower limbs in position. Repeat.

At the completion of the last step, sink to the extension of the arms, and descend yielding.

This exercise to be repeated with the left hand leading.

Fig. 4.



BOTH HANDS AT ONCE.

(THE ARMS BENT.)*

First Series.
Exercise 5.
COURSE II.

Position as in first exercise.

1. As in first exercise.

2. Bend the arms to the half reach, the chin rising above the bar, spring from both hands at once the distance of the step, retaining the arms bent and the trunk and lower limbs in position. Repeat.

Descend as in preceding exercise.

RIGHT HAND LEADING, SIDEWAYS.

(THE LEGS PENDENT.)

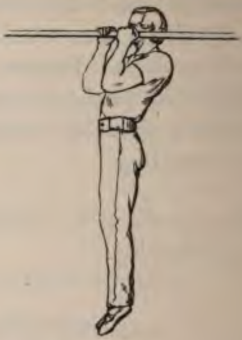
First Series.
Exercise 6.
COURSE I.

Position of attention, facing the line of the bar.

1. Spring from the ground and grasp the bar with both hands, the right in advance of, but close to the left, the fingers and thumbs meeting; bend

the arms until the head rises above the bar on the right side, and the left shoulder is immediately under the bar, the lower limbs straight and together and the toes pointed downwards (Fig. 5).

Fig. 5.



2. Advance the right hand the distance of the step, the left following, retaining the trunk and lower limbs in position. Repeat.

At the completion of the last step, sink to the extension of the arms, and descend yielding.

This exercise to be repeated with the left hand leading, the head on the left of the bar.

HAND OVER HAND, SIDEWAYS.

(THE LEGS PENDENT.)

First Series. Position as in sixth exercise.
Exercise 7. 1. As in sixth exercise.
COURSE II. 2. Pass the left hand over the right the distance of the step, advancing the body until the right breast is at the right arm, pass the right hand over the left, advancing the body until the left breast is at the left arm. Repeat, retaining the trunk and lower *limbs* in position throughout.

Descend as in sixth exercise.

BOTH HANDS AT ONCE, SIDEWAYS.

(THE LEGS PENDENT.)

First Series.
Exercise 8.
COURSE III.

Position as in sixth exercise.

1. As in sixth exercise.

2. Spring to the front with both hands at once the distance of the step, retaining the trunk and lower limbs in position. Repeat.

Descend as in sixth exercise.

RIGHT HAND LEADING, SIDEWAYS.

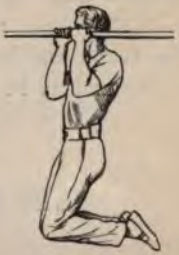
(THE LEGS BENT.)

First Series.
Exercise 9.
COURSE I.

Position as in sixth exercise.

1. As in sixth exercise, except that the lower limbs are bent at the knee, the feet to the rear, the toes pointed to the rear (Fig. 6).

Fig. 6.



2. Advance the right hand the distance of the step, the left following, retaining the trunk and lower limbs in position. Repeat.

At the completion of the last step, sink to the extension of the arms, lower the feet, and descend yielding.

This exercise to be repeated with the left hand leading, the head on the left of the bar.

HAND OVER HAND, SIDEWAYS.

(THE LEGS BENT.)

First Series. Position as in sixth exercise.
Exercise 10. 1. As in ninth exercise.
COURSE II. 2. Pass the left hand over the right the distance of the step, pass the right hand over the left the same distance, retaining the trunk and lower limbs in position. Repeat.

Descend as in ninth exercise.

BOTH HANDS AT ONCE, SIDEWAYS.

(THE LEGS BENT.)

First Series. Position as in sixth exercise.
Exercise 11. 1. As in ninth exercise.
COURSE III. 2. Spring to the front with both hands at once the distance of the step, retaining the trunk and lower limbs in position. Repeat.

Descend as in ninth exercise.

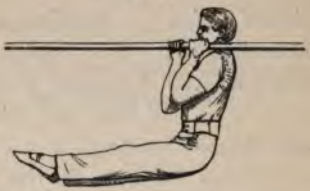
RIGHT HAND LEADING, SIDEWAYS.

(THE LEGS UP.)

First Series. Position as in sixth exercise.
Exercise 12. 1. As in sixth exercise, except that the
COURSE III. lower limbs are extended to the front in

a horizontal line under the bar, the column of the body held firm and upright, the head held back (Fig. 7).

Fig. 7.



2. Advance the right hand the distance of the step, the left following, retaining the trunk and lower limbs in position. Repeat.

At the completion of the last step, sink to the extension of the arms, lower the feet, and descend yielding.

This exercise to be repeated with the left hand leading.

HAND OVER HAND, SIDEWAYS.

(THE LEGS UP.)

First Series. Position as in sixth exercise.

Exercise 13. 1. As in twelfth exercise.

COURSE IV. 2. Pass the left hand over the right the distance of the step, pass the right hand over the left the same distance, retaining the trunk and lower limbs in position. Repeat.

Descend as in twelfth exercise.

BOTH HANDS AT ONCE, SIDEWAYS.

(THE LEGS UP.)

First Series. Position as in sixth exercise.

Exercise 14. 1. As in twelfth exercise.

COURSE IV. 2. Spring to the front with both hands at once the distance of the step, retaining the trunk and lower limbs in position. Repeat.

Descend as in twelfth exercise.

TO RISE ABOVE THE BAR, THE RIGHT LEG ACTING.

Second Series. Position as in sixth exercise.
Exercise 15. 1. Spring from the ground and grasp
Course II. the bar with both hands, right and left of the bar, the left in advance, the fingers and thumbs meeting.

2. Bend the arms, lift the lower limbs, separating the feet as they rise, pass the left leg over the bar, resting on it under the knee, pass the right leg over the left, the calf of the right overlying the instep of the left, the head held back, the trunk sustained.

3. Quit the grasp of the right hand, pass it under the bar to the opposite side next the body and grasp the bar, elevate the elbow and rest the fore-arm along the bar (Fig. 8); detach the right leg from the left, straighten it and rapidly pass it under the bar, with a momentum sufficient to enable the body se above it, press strongly with both hands, extend the dvance the left leg, and rest above the bar (Fig. 9).

Fig. 8.

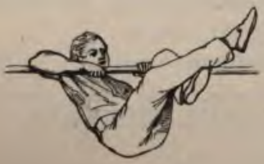
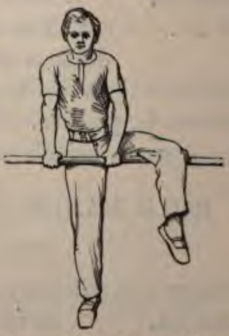


Fig. 9.



In descending, re-bend the right arm, draw back the left leg, lower the body, and place the right leg over the left as in the ascent; sustain the body, detach the legs from the bar, straighten the arms, and descend yielding.

This exercise to be repeated with the left leg acting, the right hand in advance, the right leg resting on the bar.

TO TURN ROUND THE BAR.

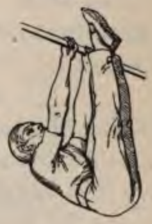
Second Series. Position as in first exercise.

Exercise 16. 1. As in first exercise, the fingers and

COURSE III. thumb meeting.

2. Lift the lower limbs in position to the front until the feet are as high as the bar, retaining the arms straight (Fig. 10); bend the arms, carry the feet and lower limbs over the bar, letting the upper part of the body pass under and up the side of the bar and over its surface, while the lower part ascends, passes its surface, and descends to the rear, until the whole body has cleared the bar, and rests in a perfectly vertical line on the hands, above the bar, the arms extended.

Fig. 10.



In descending, set the body free from the bar, straighten the arms, and descend yielding.

TO TURN ROUND THE BAR, THE HANDS REVERSED.

Second Series. Position as in first exercise.

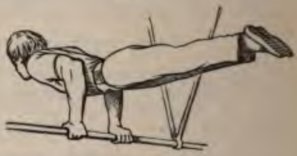
Exercise 17. 1. As in preceding exercise, but with the

COURSE III. grasps of the hands reversed.

2. As in preceding exercise, retaining the reversed grasp of the hands.

In descending, bring the elbows close in by the sides, tighten the grasp of the hands, slowly incline the head and shoulders to the front, elevate the lower limbs to the rear, sustaining the body upon the fore-arms (Fig. 11); return over the bar, passing the body again under it, bring the lower limbs to the vertical line, and descend yielding.

Fig. 11.



TO RISE TO THE BAR.

Second Series.
Exercise 18.
COURSE I.

Position as in first exercise.

1. As in sixteenth exercise (Fig. 12).

2. Bend the arms, raising the body until the chin rises above the bar (Fig. 13), sink again to the full extension of the arms, quit the grasp, and descend yielding.

This exercise to be repeated with the lower limbs extended horizontally to the front.

This exercise should
arried into the se-
, third, and fourth

Fig. 12.

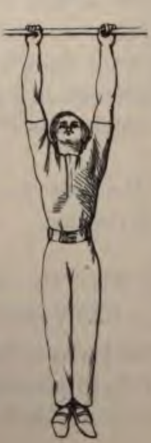
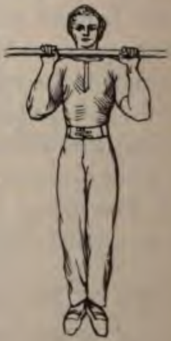


Fig. 13.



courses by rising to the bar three, six, nine, twelve, or more times consecutively and without pause, according to the capacity of the learner.

TO RISE TO THE BAR, THE HANDS REVERSED.

Second Series. Position as in first exercise.
Exercise 19. 1. As in preceding exercise, except that
COURSE I. the grasp of the hands is reversed.
2. As in preceding exercise.

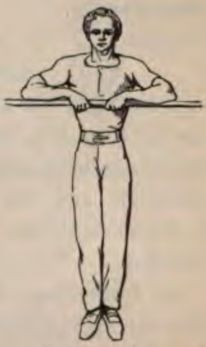
This exercise to be repeated and varied as directed for preceding exercise.

TO RISE ABOVE THE BAR BY THE FORE-ARM, RIGHT AND LEFT.

Second Series. Position as in first exercise.
Exercise 20. 1. As in sixteenth
COURSE II. exercise.

2. Bend the arms until the chin rises above the bar, raise the right elbow and extend the fore-arm along the surface of the bar, the left following on the left (Fig. 14), press strongly with the hands, straighten the right arm to its full extension, the left following, and remain sustained by the hands, in the vertical line, above the bar.

Fig. 14.



In descending, let the left fore-arm return to the bar, the right following, pass the left beneath the bar, the right following, quit the grasp, and descend yielding.

TO RISE ABOVE THE BAR BY THE FORE-ARM, BOTH HANDS AT ONCE.

Second Series.
Exercise 21.
Course II.

Position as in first exercise.

1. As in preceding exercise.

2. Bend the arms as in preceding exercise, raise both elbows and extend the fore-arms along the surface of the bar, press strongly with the hands, straighten both arms to their full extension, and rise above the bar as in preceding exercise.

In descending, let both fore-arms slowly return to the bar, pass both arms beneath the bar, quit the grasp, and descend yielding.

TO RISE ABOVE THE BAR, RIGHT AND LEFT.

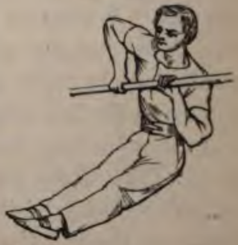
Second Series.
Exercise 22.
Course IV.

Position as in first exercise.

1. As in sixteenth exercise.

2. Bend the arms until the chin rises above the bar, and raise the right elbow vertically above the bar (Fig. 15), the left following, straighten both arms to their full extension, and rise above the bar in the vertical line, as in preceding exercise.

Fig. 15.



In descending, re-bend the left arm, the right following, let the left nk below the bar, the right follow- straighten the arms, and descend yielding.

s exercise to be repeated with the left hand leading.

TO RISE ABOVE THE BAR, BOTH HANDS AT ONCE.

Second Series.
Exercise 23.
COURSE IV.

Position as in first exercise.

1. As in sixteenth exercise.

2. Bend the arms until the chin rises above the bar, and without pause press strongly upon the bar with both hands at once, continue the upward movement and rise above it (Fig. 16), immediately completing the extension of the arms, and sustain the body, on the hands, in the vertical line above the bar (Fig. 17). This series of movements to be executed without pause and at the same pace throughout.

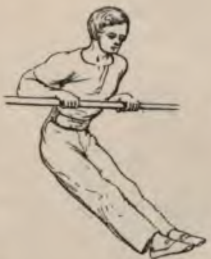


Fig. 16.

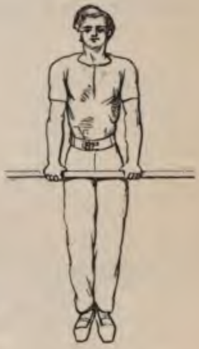


Fig. 17.

In descending, slowly re-bend the arms, sink beneath the bar, quit the grasp, and descend yielding.

TO RISE ABOVE THE BAR BACKWARDS, RIGHT AND LEFT.

Second Series.
Exercise 24.
COURSE IV.

Position as in first exercise.

1. As in sixteenth exercise, but the grasp of the right hand reversed.

2. Raise the lower limbs by the front

in position until the feet are as high as the bar, pass the feet under the bar, between the hands, straighten the lower limbs and let them descend by the rear (Fig. 18), elevate the right side of the body, bringing it close up by the bar, and pressing strongly with the right hand until the fore-arm is straight above the bar, slackening but not quitting the grasp of the left hand (Fig. 19); support the weight of the body entirely on the right arm, quit the grasp of the left hand and re-grasp the bar at the distance beyond the right, at the same time turning the breast fully round to the bar, and resting equally on both hands (Fig. 20).

Fig. 18.

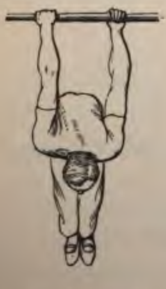


Fig. 19.

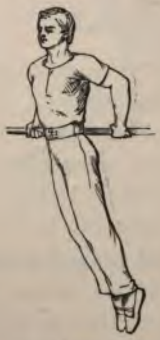
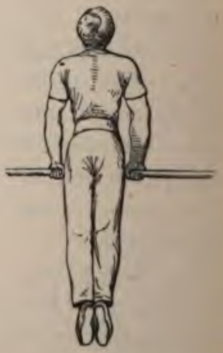


Fig. 20.



In descending, reverse the movements of the ascent, or descend as in twenty-third exercise.

This exercise to be repeated, left and right.

TO RISE ABOVE THE BAR BACKWARDS, BOTH HANDS AT ONCE.

Second Series.
Exercise 25.
COURSE IV.

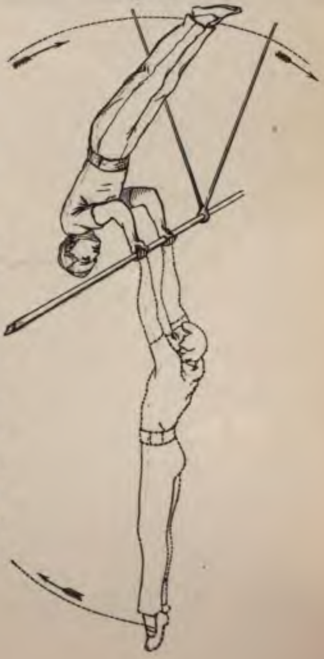
Position as in first exercise.

1. As in sixteenth exercise, but the grasp of both hands reversed.

2. As in preceding exercise to the elevation of the right fore-arm above the bar; from this point instead of quitting the grasp of the left hand, elevate the left side and raise the fore-arm above the bar, press strongly from both hands and rise seated on the bar.

In descending, reverse the movements of the ascent.

Fig. 21.



TO ENCIRCLE THE BAR.

Second Series.
Exercise 26.
COURSE IV.

Position as in first exercise.

1. Spring from the ground and grasp the bar with both hands, the fingers and thumbs meeting, bend the arms and instantly shoot the lower limbs and the whole column of the body to the front, over the bar (Fig. 21), continue the circle lowering the body by the rear, quit the grasp, and descend yielding.

The following exercises on the trapezium may also be executed on this machine.

Exercise 8. To turn round the bar backwards and return.

Exercise 9. To turn under the bar on one hand. (The lower limbs being retained in the vertical line, instead of being folded under the body.)

Exercise 12. To form the straight line.

Combinations of the exercises of the second series on this machine may also be formed on the same principle as the combinations on the trapezium.

* * *

THE BRIDGE LADDER.

For elementary purposes this form of ladder is very superior to any other; 1st, because on it the movements of both the ascent and descent in each exercise may be performed in one continuous effort; 2nd, it admits of the free practice of the most difficult exercises with perfect safety, which is not the case with the exercises of the second series on a ladder of any other form; and 3rd, an entire class of men may practise on it at the same time. The range of exercises which it presents is of the widest, and extends over all the courses of the system.

The first series, *by the sides*, is valuable to beginners, whether its exercises are performed with the arms retained at the reach, as should be the case in the initiatory lessons, or with them bent at the half reach, as should be the case when the muscular power of the learner has been so far increased as to enable him to execute them in their perfect form, as given in the text. In the very first exercise of this series the upper region of the trunk receives exercise of the highest order, and every valuable quality is heightened as the series advances; the lower limbs and column of the body being held straight and compact, while the upper portion of the trunk is urged to energetic employment in the best position, for the same action which lifts the breast upwards and forwards, also flattens the back and sustains the shoulders square to the front; while the grip of the hands at the width of the ladder, slightly exceeding the natural width of the shoulders, tends at every movement to promote the expansion of this part of the body.

The second series, *by the spars*, is much more arduous than the first, as, during the step, the weight of the body is wholly sustained by one hand in the most difficult of positions, viz. with the fore-arm bent at a right angle to the upper arm. The double-handed exercises are specially arduous, requiring and yielding in their practice, not only great tension of muscle, but also great rapidity of action, precision and security of grasp, quickness of eye, presence of mind, and decision.

The exercises of the third series, *sitting*, neither require nor give any of the qualities just enumerated, except the muscular power, and this they both give and require in a very high degree.

Until the action and position of the step have been fairly acquired, the learners should be passed along the ladder singly, the instructor walking by the side and indicating the various points in the exercise to be observed. In the second series, and especially with e double-handed exercises, until the learners have attained to considerable strength and dexterity, they should not be allowed to pass the arch of the bridge.

When the exercises can be executed with sufficient accuracy, the learners should follow each other in rapid succession, at intervals of a few feet, returning to the starting-point, ready to begin another exercise as soon as the last of the class shall have traversed the ladder.

The position of the instructor is by the side of or behind the learner in the initiatory lessons; in the more advanced lessons on the right of the machine.

The bridge ladder should span not less than 30 feet or more than 40 feet. With a span of 30 feet the uprights should be 7 feet 6 inches above the floor, and the apex or centre of the span 12 feet above the floor, the latter being slightly increased for a greater span. The width of the ladder should be 14 inches, and the thickness of the sides 2 inches, rounded to fit the hands; the spars should be 9 inches apart.

FIRST SERIES ....*By the sides.*
SECOND SERIES .. ..*By the spars.*
THIRD SERIES..........*Sitting.*

RIGHT HAND LEADING, BACKWARDS.

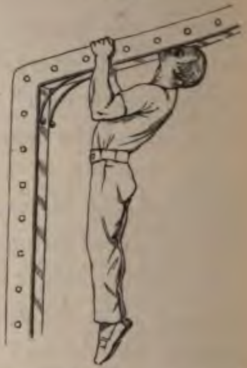
First Series.
Exercise 1.
COURSE I.

Position of attention, under the ladder, facing the upright.

1. Spring from the ground and grasp the sides of the ladder, bending the arms as

at the half reach, the head held back, the breast advanced, the column of the body held firm and upright, the legs together and straight, the feet together, the toes pointed to the ground (Fig. 1).

Fig. 1.



2. Advance the right hand about the distance of the space between the spars, the left following on the left to a position exactly opposite the right. Repeat.

In descending from the ladder at the completion of the exercise, point the toes to the ground, lower the body to the reach of the arms, quit the grasp and descend yielding.

This exercise to be repeated with the left hand leading.

Throughout all exercises on this machine, the body is to be held perfectly firm in the line of the ladder,—no oscillation whatever from side to side taking place. The tendency of the body to oscillate being greater after passing the apex of the ladder, it is in the descent that it should be especially guarded against.

RIGHT AND LEFT, BACKWARDS.

First Series. Position as in first exercise.
xercise 2. 1. As in first exercise.
RSE I. 2. Advance the right hand about the distance of the space between the spars;

advance the left hand the same distance beyond the right, and the right hand the same distance beyond the left; the body and lower limbs in the position of first exercise. Repeat.

Descend as in first exercise.

BOTH HANDS AT ONCE, BACKWARDS.

First Series.
Exercise 3.
Course II.

Position as in first exercise.

1. As in first exercise.

2. Spring upward and rearward with both hands the distance of the space between the spars, retaining the arms well bent, and the column of the body and the lower limbs in position. Repeat.

Descend as in first exercise.

RIGHT HAND LEADING, FORWARDS.

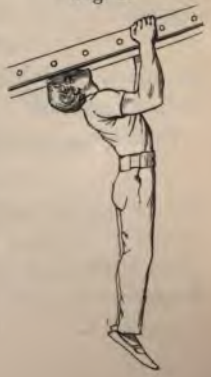
First Series.
Exercise 4.
Course I.

Position of attention, under the ladder, the back to the upright.

1. Spring from the ground and grasp the sides of the ladder, bending the arms as at the half reach, the head held back, the breast strongly lifted upwards and forwards, the lower portion of the trunk and legs held firm and straight, the feet together, the toes pointed to the ground (Fig. 2).

2. Advance the right hand about the distance of the space between the

Fig. 2.



spars, the left following on the left to a position exactly opposite the right. Repeat.

Descend as in first exercise.

This exercise to be repeated with the left hand leading.

RIGHT AND LEFT, FORWARDS.

First Series.
Exercise 5.
Course I.

Position as in fourth exercise.

1. As in fourth exercise.

2. Advance the right hand about the distance of the space between the spars; advance the left hand the same distance beyond the right, and the right hand the same distance beyond the left; the body and lower limbs in the position of first exercise. Repeat.

Descend as in first exercise.

BOTH HANDS AT ONCE, FORWARDS.

First Series.
Exercise 6.
Course II.

Position as in fourth exercise.

1. As in fourth exercise.

2. Spring upward and forward with both hands the distance of the space between the spars, retaining the column of the body and the lower limbs in position. Repeat.

Descend as in first exercise.

RIGHT HAND LEADING, SIDEWAYS.

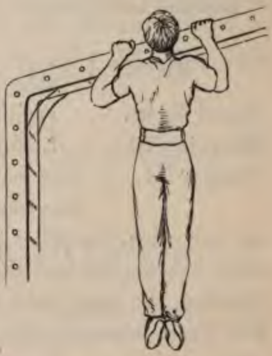
First Series.
rcise 7.
se IV.

Position of attention, at the side of the ladder.

1. Spring from the ground and grasp

the side of the ladder with the hands at the distance; immediately bend the arms until the hands are as at the rest, the chin above the ladder, the head erect, the trunk of the body held firm and compact, the legs straight and together, the feet together, the toes pointed to the ground (Fig. 3).

Fig. 3.



2. Advance the right hand about the distance of the space between the spars, advance the left the same distance, retaining the chin above the ladder, and the trunk of the body and lower limbs in position. Repeat.

In descending from the ladder, lower the body to the reach of the arms, point the toes to the ground, and descend yielding.

This exercise to be repeated on the opposite side of the ladder, the left hand leading.

HAND OVER HAND, SIDEWAYS.

First Series.
Exercise 8.
COURSE IV.

Position as in seventh exercise.

1. As in seventh exercise.

2. Pass the right hand over the left, withdraw the left and advance it beyond the right, retaining the body and lower limbs in position. Repeat.

Descend as in seventh exercise.

BOTH HANDS AT ONCE, SIDEWAYS.

First Series.
Exercise 9.
COURSE IV.

Position as in seventh exercise.

1. As in seventh exercise.

2. Spring with both hands to the left the distance of the space, and immediately without pause repeat the step.

Descend as in seventh exercise.

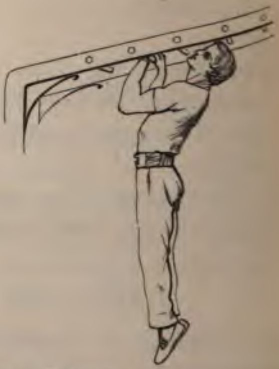
RIGHT HAND LEADING, BACKWARDS.

Second Series.
Exercise 10.
COURSE III.

Position as in first exercise.

1. Spring from the ground and with both hands grasp the first spar, bending the arms as at the half reach, the palms to the front, the fingers and thumbs together, the head held back, the breast advanced, the eyes directed to the next spar, the column of the body held firm and upright, the legs together and straight, the feet together, the toes pointed to the ground (Fig. 4).

Fig. 4.



2. Advance the right hand to the next spar, the left following to the same spar, the body and lower limbs in position. Repeat.

Descend as in first exercise.

This exercise to be repeated with the left hand leading; with the hands reversed; also passing a spar at each

RIGHT AND LEFT, BACKWARDS.

Second Series. Position as in first exercise.
Exercise 11. 1. As in tenth exercise.
COURSE III. 2. Advance the right hand to the next spar, advance the left hand to the spar beyond that grasped by the right, and the right hand to the spar beyond that grasped by the left; the body held square to the front in position. Repeat.

Descend as in first exercise.

This exercise to be repeated with the hands reversed.

BOTH HANDS AT ONCE, BACKWARDS.

Second Series. Position as in first exercise.
Exercise 12. 1. As in tenth exercise.
COURSE IV. 2. Spring to the second spar with both hands, and without pause spring to the third, retaining the arms well bent, and the trunk and lower limbs in position, and avoiding all front and rear oscillation. Repeat.

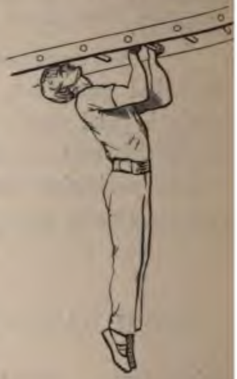
Descend as in first exercise.

RIGHT HAND LEADING, FORWARDS.

Second Series. Position as in fourth exercise.
Exercise 13. 1. Spring from the ground and with both
COURSE III. hands grasp the first spar, bending the arms as at the half reach, the palms to the front,

the fingers and thumbs together, the head held back, t breast advanced, the eyes directed to the next spar, t whole column of the body held firm and upright, the legs together and straight, the feet together, the toes pointed to the ground (Fig. 5).

Fig. 5.



2. Advance the right hand to the next spar, the left following to the same spar, the trunk and lower limbs firmly held in position. Repeat.

Descend as in first exercise.

This exercise to be repeated with the left hand leading; also with the hands reversed; also passing a spar.

RIGHT AND LEFT, FORWARDS.

Second Series.
Exercise 14.
COURSE III.

Position as in fourth exercise.

1. As in thirteenth exercise.

2. Advance the right hand to the n spar, advance the left hand to the spar yond that grasped by the right, and the right hand to spar beyond that grasped by the left; the body held squ to the front in position. Repeat.

Descend as in first exercise.

This exercise to be repeated with the hands reversed.

BOTH HANDS AT ONCE, FORWARDS.

Second Series.
Exercise 15.
COURSE IV.

Position as in fourth exercise.

1. As in thirteenth exercise.

2. Spring to the second spar with both hands, and without pause spring to the third, retaining the arms well bent, and the trunk and lower limbs in position, and avoiding all front and rear oscillation. Repeat.

Descend as in first exercise.

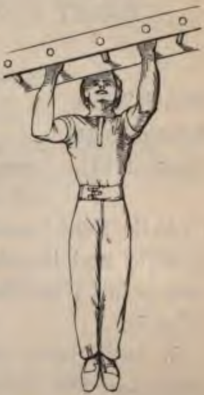
RIGHT HAND LEADING, SIDEWAYS.

Second Series.
Exercise 16.
COURSE III.

Position of attention under the ladder, the upright on the left.

1. Spring from the ground and grasp the first spar with the left hand, and the third spar with the right hand, bending the arms as at the half reach; the palms of both hands facing inwards, the fingers and thumbs together, the head held back, the breast advanced, the lower portion of the trunk and legs held firm and straight, the legs together, the feet together, the toes pointed to the ground (Fig. 6).

Fig. 6.



2. Advance the right hand to the next (the fourth) spar, advance the left hand to the next (the second) spar, retaining the arms well

bent, and the column of the body and lower limbs in position. Repeat.

Descend as in first exercise.

This exercise to be repeated with the left hand leading.

BOTH HANDS AT ONCE, SIDEWAYS.

Second Series.
Exercise 17.
COURSE IV.

Position as in sixteenth exercise.

1. As in sixteenth exercise.

2. Spring from both hands, and with the right hand grasp the next (the fourth) spar, and with the left hand grasp the next (the second) spar, the rest of the body as in preceding exercise. Repeat.

Descend as in first exercise.

RIGHT HAND LEADING, BACKWARDS.

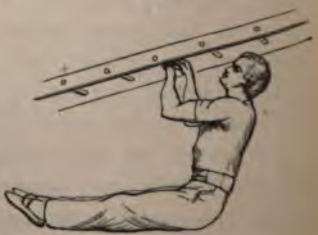
(BY THE SPARS.)

Third Series.
Exercise 18.
COURSE III.

Position as in first exercise.

1. As in tenth exercise, except that the lower limbs are extended to the front horizontally, straight and together, the toes pointed to the front (Fig. 7).

Fig. 7.



2. As in tenth exercise, retaining the trunk and lower limbs in position. peat.

In descending from the ladder, let the lower limbs fall in position to the vertical line, lower the body to the reach of the arms, point the toes to the ground, and descend yielding.

This exercise to be repeated with the left hand leading.

RIGHT AND LEFT, BACKWARDS.

(BY THE SPARS.)

Third Series. Position as in first exercise.
Exercise 19. 1. As in eighteenth exercise.
COURSE IV. 2. As in eleventh exercise, retaining the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

BOTH HANDS AT ONCE, BACKWARDS.

(BY THE SPARS.)

Third Series. Position as in first exercise.
Exercise 20. 1. As in sixteenth exercise.
COURSE IV. 2. As in twelfth exercise, retaining the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

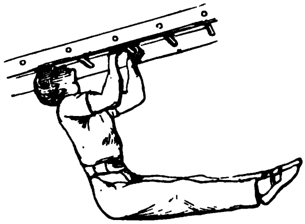
RIGHT HAND LEADING, FORWARDS.

(BY THE SPARS.)

Third Series. Position as in fourth exercise.
Exercise 21. 1. As in thirteenth exercise, except that
COURSE III. the lower limbs are extended to the front

horizontally, straight and together, the toes pointed to the front (Fig. 8).

Fig. 8.



2. As in thirteenth exercise, retaining the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

This exercise to be repeated with the left hand leading.

RIGHT AND LEFT, FORWARDS.

(BY THE SPARS.)

Third Series. Position as in fourth exercise.
Exercise 22. 1. As in twenty-first exercise.
COURSE IV. 2. As in fourteenth exercise, retaining the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

BOTH HANDS AT ONCE, FORWARDS.

(BY THE SPARS.)

Third Series. Position as in fourth exercise.
Exercise 23. 1. As in twenty-first exercise.
COURSE IV. 2. As in fifteenth exercise. Repeat.
Descend as in eighteenth exercise.

LEFT HAND LEADING, SIDEWAYS.

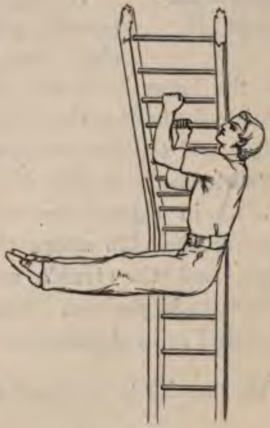
(BY THE SPARS.)

Third Series.
Exercise 24.
COURSE III.

Position as in sixteenth exercise.

1. As in sixteenth exercise, except that the lower limbs are extended to the front horizontally, straight and together, the toes pointed to the front (Fig. 9).

Fig. 9.



2. As in sixteenth exercise, retaining the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

This exercise to be repeated with the right hand leading.

BOTH HANDS AT ONCE, SIDEWAYS.

(BY THE SPARS.)

Third Series.
Exercise 25.
COURSE IV.

Position as in sixteenth exercise.

1. As in twenty-fourth exercise.

2. As in seventeenth exercise, retaining the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

LEFT HAND LEADING, SIDEWAYS.

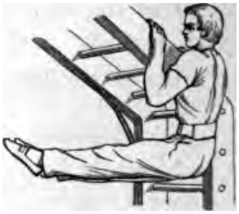
(BY THE SIDES.)

Third Series.
Exercise 26.
COURSE III.

Position as in seventh exercise.

1. As in seventh exercise, except that the lower limbs are extended to the front horizontally, straight and together, the toes pointed to the front (Fig. 10).

Fig. 10.



2. As in seventh exercise, retaining the chin above the ladder, and the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

This exercise to be repeated with the right hand leading.

HAND OVER HAND, SIDEWAYS.

(BY THE SIDES.)

Third Series.
Exercise 27.
COURSE IV.

Position as in seventh exercise.

1. As in twenty-sixth exercise.

2. As in eighth exercise, retaining the chin above the ladder, and the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

BOTH HANDS AT ONCE, SIDEWAYS.

(BY THE SIDES.)

Third Series.
Exercise 28.
COURSE IV.

Position as in seventh exercise.

1. As in twenty-sixth exercise.

2. As in ninth exercise, retaining the chin above the ladder, and the trunk and lower limbs in position. Repeat.

Descend as in eighteenth exercise.

* * *

THE PLANK.

THERE is no machine more simple than this, and none which may be made more directly and practically useful. All its exercises are of a simple kind, requiring and giving in their practice suppleness rather than strength.

The Plank should be 14 inches wide and 1½ inch thick. Its length may vary from 14 feet to 20 feet: its inclination should be frequently varied.

FIRST SERIES......	*With hands and feet.*
SECOND SERIES....	*With hands and knees.*
THIRD SERIES.....	*With the legs suspended.*
FOURTH SERIES....	*With the hands only.*

RIGHT HAND LEADING.

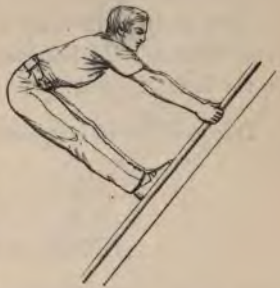
First Series.
Exercise 1.
COURSE I.

Position of attention, facing the plank, the toes touching it.

1. Lean forward, raise the right hand and grasp the edge of the plank at the half reach, the left following on the left, the fingers under, the thumbs above and pointed upwards; lift the right foot

from the ground, and place it on the plank, lift the left foot and place it beside the right, the legs straight, the feet flat upon the plank, the arms straight and firm, the head held back, the eyes directed to the reach of the hands (Fig. 1).

Fig. 1.



2. Raise the right hand to the reach, the left following on the left; incline the body to the front, draw up the right foot the distance of the step, the left following on the left. Repeat.

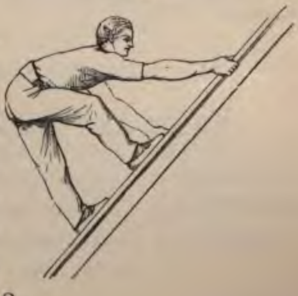
In descending, slip down the right foot the distance of the step, the left following on the left, slip down the right hand, the left following on the left. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT SIDE LEADING.

First Series. Position as in first exercise.
Exercise 2. 1. As in first exercise.
COURSE I.

Fig. 2.



2. Slightly incline the body to the left, raise the right hand to the reach, and at the same time lift the right foot the distance of the step (Fig. 2); slightly incline the body to the right, raise the left hand to the reach opposite

the right and at the same time lift the left foot and place it beside the right. Repeat.

In descending, slip the right hand down the distance of the step and at the same time slip the right foot down the same distance; the left hand and left foot following together on the left. Repeat.

This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

First Series.
Exercise 3.
COURSE I.

Position as in first exercise.

1. As in first exercise.

2. Slightly incline the body to the left, raise the right hand to the reach, and at the same time lift the right foot the distance of the step, as in Fig. 2; incline the body to the right, raise the left hand and left foot the distance of the step beyond the right hand and right foot. Repeat the step with the left hand and foot, passing the right.

In descending, slip down the leading hand and foot the distance of the step below the supporting hand and foot. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

First Series.
Exercise 4.
COURSE I.

Position as in first exercise.

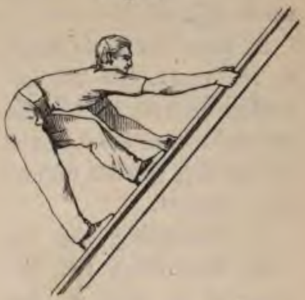
1. As in first exercise.

2. Raise the right hand a short step, and at the same time lift the left foot the same

distance (Fig. 3), raise the left hand the distance of the step beyond the right, and at the same time lift the right foot beyond the left. Repeat.

In descending, slip the leading hand and foot down a short step, below the supporting hand and foot. Repeat.

Fig. 3.



BOTH HANDS AT ONCE.

First Series.
Exercise 5.
COURSE II.

Position as in first exercise.

1. Lean forward, raise both hands and grasp the edges of the plank as in first exercise, lift both feet and place them on the plank, then rest the body as in first exercise.

2. Shoot up both hands to the reach, inclining the body to the front, draw up both feet the distance of the step. Repeat.

In descending, slip down both feet the distance of the step, bring the hands down the same distance. Repeat.

RIGHT HAND LEADING.

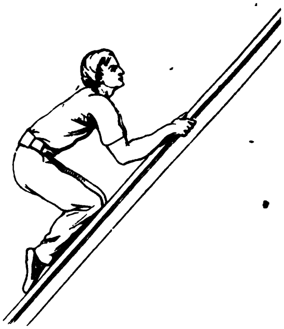
Second Series.
Exercise 6.
COURSE II.

Position as in first exercise.

1. Lean forward and grasp the plank as in first exercise; lift the right leg and place the knee upon the plank, the front of the leg from the knee to the point of the toes resting on

its surface, the left following on the left, the head he back, the arms at the half reach (Fig. 4).

Fig. 4.



2. Raise the right hand to the reach, the left following on the left; raise the right knee the distance of the step, the left following. Repeat.

In descending, slip the right knee down the distance of the step, the left following; slip the right hand down the same distance, the left following. Repea

This exercise to be repeated with the left hand leading.

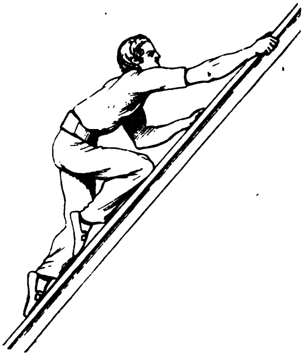
RIGHT SIDE LEADING.

Second Series. Position as in first exercise.

Exercise 7. 1. As in sixth exercise.

Course II.

Fig. 5.



2. Raise the right hand to the reach, and at the same time lift the right knee the distance of the step (Fig. 5); raise the left hand to the reach opposite the right, and at the same time lift the left knee and place it beside the *right.* Repeat.

In descending, slip the right hand down the distance of the step and at the same time slip the right knee down the same distance, the left hand and left knee following together on the left. Repeat.

This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

Second Series.
Exercise 8.
COURSE II.

Position as in first exercise.

1. As in sixth exercise.

2. Raise the right hand to the reach and at the same time lift the right knee the distance of the step, as in Fig. 5; raise the left hand and left knee the distance of the step beyond the right hand and right knee. Repeat the step with the left hand and foot, passing the right.

In descending, slip down the leading hand and knee the distance of the step below the supporting hand and foot. Repeat.

RIGHT AND LEFT, HAND AND KNEE.

Second Series.
Exercise 9.
COURSE II.

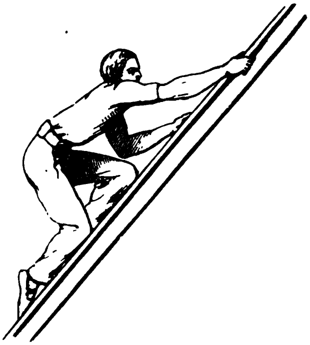
Position as in first exercise.

1. As in sixth exercise.

2. Raise the right hand a short step, and at the same time lift the left knee the same

distance (Fig. 6); raise the left hand the distance of the step beyond the right, and at the same time lift the right knee beyond the left. Repeat.

Fig. 6.



In descending, slip the leading hand and knee down a short step, below the supporting hand and knee. Repeat.

BOTH HANDS AT ONCE.

Second Series.
Exercise 10.
COURSE III.

Position as in first exercise.

1. Lean forward, raise both hands and grasp the edges of the plank, as in sixth exercise, lift both feet and place the knees upon the plank, as in sixth exercise.

2. Shoot up both hands to the reach, set the legs free from the plank, and draw up both knees the distance of the step. Repeat.

In descending, set the legs free from the plank, and slip down both knees the distance of the step, bring the hands down the same distance. Repeat.

BOTH HANDS AT ONCE, THE LEGS SUSPENDED.

Third Series.
Exercise 11.
COURSE IV.

Position as in first exercise.

1. Raise both hands and grasp the plank as in preceding exercise; lift both legs from

the ground and pass them right and left over the plank, resting on the edge of it under the knee, the fore-legs pendent on either side, the arms bent, the trunk of the body sustained, the head held back (Fig. 7).

Fig. 7.

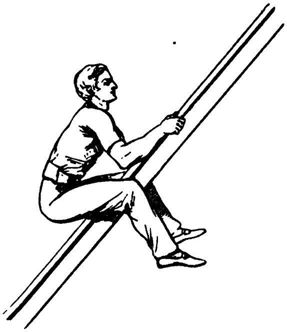
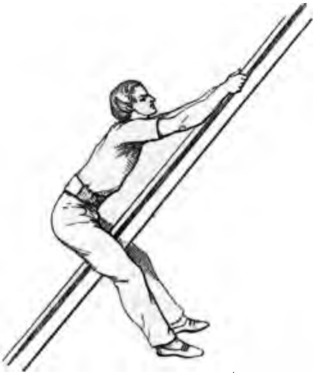


Fig. 8.



2. Lean forward and shoot up both hands to the reach (Fig. 8), raise the lower limbs the same distance. Repeat.

In descending, pass the lower limbs down the distance of the step, lower the hands. Repeat.

THE RIGHT HAND LEADING.

Fourth Series.
Exercise 12.
COURSE III.

Position as in first exercise.

1. Lean forward and with the right hand at the reach grasp the edge of the plank, the left following on the left, the column

of the body aligned down the centre of the plank, the head slightly bent back; the legs straight and together, the toes pointed downwards, the surface of the feet resting on the plank (Fig. 9).

2. Bend the arms and raise the body to the half reach; raise the right hand to the reach (Fig. 10), the left following on the left, draw up the body to the half reach. Repeat.

In descending, slip the right hand down to the rest, the left following on the left, lower the body to the reach of the hands. Repeat.

This exercise to be repeated with the left hand leading.

Fig. 9.

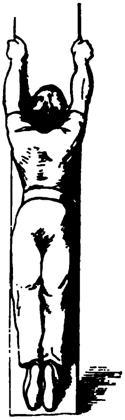
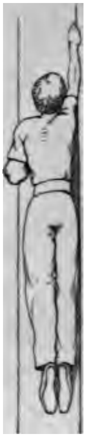


Fig. 10.



RIGHT AND LEFT.

Fourth Series.
Exercise 13.
COURSE III.

Position as in first exercise.

1. As in twelfth exercise.

2. Bend the arms and raise the body as in preceding exercise; raise the right hand to the reach and at the same time elevate the body to the rest of the left, raise the left hand to the reach beyond the right, at the same time elevate the body to the rest of the right. Repeat, the leading hand passing the supporting hand at each step.

In descending, slip the right hand down to the rest, lower the body to the reach of the left; slip the left hand down below the right, and lower the body to the reach of the right. Repeat.

BOTH HANDS AT ONCE.

Fourth Series.
Exercise 14.
COURSE IV.

Position as in first exercise.

1. As in twelfth exercise.

2. Bend the arms and raise the body to the half reach of the hands, and on the instant shoot up both hands to the reach, draw up the body to the half reach. Repeat.

In descending, slip both hands down to the rest, lower the body to the reach. Repeat.

THE LADDER PLANK.

THIS machine admits of different forms of construction, and this variety of construction greatly extends its range of exercises, and their adaptability to meet the requirements of individuals of different degrees of strength. It is found that the effort required to perform some of the exercises is in direct relation to the depth of the machine. In every gymnasium, therefore, there should be several of these machines, varying in thickness from 1½ inch to 6 inches.

The exercises on this machine, as on the preceding one, are purely elementary, although the machine itself is a union of two of the most strictly practical ones in the system. They address themselves to the entire body, though not equally, the upper region of the trunk being the part most directly affected by them, and that so favourably that there is no machine in the gymnasium which so rapidly or so powerfully aids in the expansion and development of this all-important part of the body, and as the exercises are all of a simple and safe nature, they cannot be practised too frequently.

A single glance at the position and action of the body when extended on this machine will show not only what it is meant to effect, but its mode of effecting it; for while the back is forced to take absolutely the conformation of the plank upon which it is extended, the obverse side of the body is, by the very act which flattens the back, rounded and advanced to its most advantageous position and shape; this is especially the case with the exercises of the third series, where the effect of the uplifted arms is still further to depress the shoulders and advance the front and sides of the chest; the position of the neck and head contributes to the same result, and the downward pull of the hands in the ascent, with the gradual extension of the arms on the lowering of the body in the descent, increase the effort and augment the good to be derived from these exercises. The muscles of the back are also employed in the most advantageous manner.

The position of the instructor is on the left of the plank.

As above stated there are several varieties of this machine. The simplest form is that of a plank 1½ inch thick and 18 inches wide, the extreme thickness or depth of the plank being 6 inches with a width of 12 inches only; the intermediate thicknesses being of proportionate width. The spars should be 9 inches apart and project 6 inches on each side of the plank.

and at the same time lift the right foot to the second spar (Fig. 3); straighten the right knee, bend the right arm, and elongate the trunk and at the same time raise the left hand to the spar above that grasped by the right, and lift the left foot to the spar above that occupied by the right. Repeat the step, the leading hand and foot always passing the spars occupied by the supporting hand and foot.

In descending, slip the leading hand down to the spar below that grasped by the supporting hand, and at the same time slip the leading foot to the spar below that occupied by the supporting foot. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

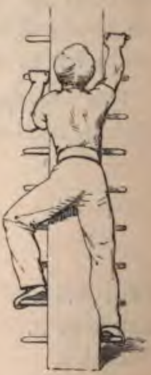
First Series. Position as in first exercise.

Exercise 4. 1. As in first exercise.

COURSE I. 2. Raise the right hand to the next spar, and at the same time lift the left foot to the second spar (Fig. 4); straighten the left knee, bend the right arm, and elongate the trunk, and at the same time raise the left hand to the spar above that grasped by the right, and lift the right foot to the spar above that occupied by the left. Repeat the step, the leading hand and foot always passing the spars occupied by the supporting hand and foot.

In descending, slip the leading hand down to the spar below that grasped by the supporting hand, and at the same

Fig. 4.



In descending, slip the right foot down to the next spar, the left foot following on the left; slip the right hand down to the next spar, the left hand following on the left. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT SIDE LEADING.

First Series.
Exercise 2.
COURSE I.

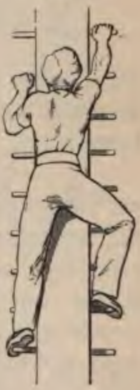
Position as in first exercise.

1. As in first exercise.
2. Raise the right hand to the next spar, and at the same time lift the right foot to the second spar (Fig. 3), the left hand and left foot following together on the left the same distance; straighten the knees and elongate the trunk. Repeat.

In descending, slip the right hand down to the next spar and at the same time slip the right foot down to the next spar, the left hand and left foot following together on the left to the same spar. Repeat.

This exercise to be repeated with the left side leading.

Fig. 3.



RIGHT AND LEFT SIDE.

First Series.
Exercise 3.
COURSE I.

Position as in first exercise.

1. As in first exercise.
2. Raise the right hand to the next spar,

2. Bend the arms and raise the body to the half reach (Fig. 7), and on the instant raise the right hand to the next spar (Fig. 8), the left hand following on the left. Repeat.

Fig. 6.

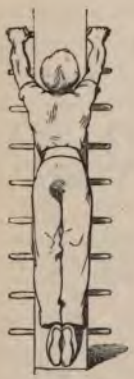


Fig. 7.

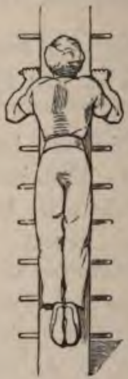
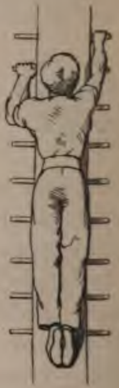


Fig. 8.



In descending, slip the right hand down to the next spar, the left hand following on the left, retaining the arms bent at the half reach, as in Fig. 7. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT AND LEFT.

ond Series.
ercise 7.
RSE III.

Position as in first exercise.

1. As in sixth exercise.

2. Bend the arms and raise the body to the half reach, and raise the right hand

to the next spar, as in sixth exercise; elevate the body to the rest of the left hand, and on the instant raise it to the spar above that grasped by the right. Repeat.

In descending, slip the leading hand down to the spar below that grasped by the supporting hand. Repeat.

BOTH HANDS AT ONCE.

Second Series.
Exercise 8.
COURSE IV.

Position as in sixth exercise.

1. Raise both hands and grasp the spar nearest the reach, the rest of the body as in sixth exercise, Fig. 6.

2. Bend the arms and raise the body to the half reach of the hands, and on the instant shoot up both hands to the next spar and elevate the body to the half reach of the hands. Repeat.

In descending, slip both hands down to the next spar, retaining the arms bent at the half reach. Repeat.

BACKWARDS.

(DESCENDING BY THE SPARS.)

Third Series.
Exercise 9.
COURSE I.

Position of attention, the back to the plank, the heels touching it.

1. Lean back and rest on the plank, elevate both hands and grasp the spars right and left nearest the reach, the palms to the front, the thumb and fingers meeting round the spar, the head resting on the plank, the eyes directed to the front, the trunk of

the body aligned down the centre of the plank and on its surface, the feet on the lowest spar (Figs. 9 and

Fig. 9.

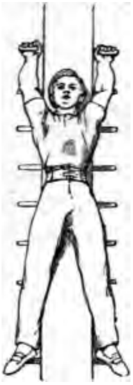
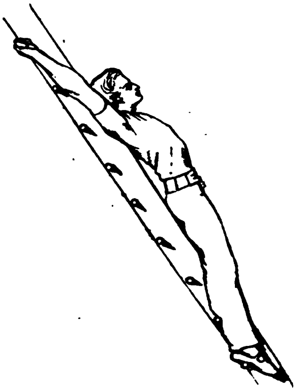


Fig. 10.



2. Raise both feet to the second spar, straighten the and elongate the trunk. Repeat.

In descending, slip both feet down to the next spar, ing the body to the reach of the hands, slip both hands to the next spar. Repeat.

BACKWARDS.

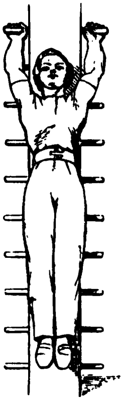
(DESCENDING BY THE CENTRE.)

Third Series. Position as in ninth exercise.
Exercise 10. 1. As in ninth exercise.
COURSE II. 2. The ascent as in ninth exercis
In descending, (1) bring both feet

centre of the plank, the toes pointed downwards, the heels together and resting on the plank, the knees straight and together, the whole column of the body from the heels upwards perfectly aligned down the centre of the plank.

(2) Lower the body to the reach of the hands (Fig. 11); separate the feet right and left and place them on their respective spars, slip both hands down to the next spar. Repeat.

Fig. 11.



* * *

THE INCLINED LADDER.

It may seem unnecessary to teach by formal instructions exercises so simple as many of those directed in the text to be performed on this machine, but their usefulness may be readily proved. Let a dozen men be taken at hazard and desired to climb a ladder at any given incline, and it will be found that scarcely two will do so in the same manner, scarcely two will maintain throughout the ascent the position and action with which they began, while uncertainty, hesitation, and insecurity will more or less mark the efforts of all. The practised gymnast, on the contrary, will mount it as surely and as rapidly as if it were a staircase, in any one of a dozen different ways, on its being merely indicated by the name which it bears in his book of instructions.

This machine is an ordinary ladder, but it should be carefully constructed, and the materials well selected. The width of the ladder between the supports should be 14 or 15 inches, and the spars 9 inches apart.

The inclination of the ladder should be frequently aried.

FIRST SERIES . . . . . . *Above the Ladder.*
SECOND SERIES . . . . *Under the Ladder.*
THIRD SERIES . . . . . *The hands only.*

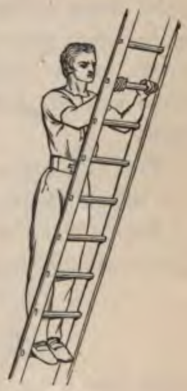
RIGHT HAND LEADING.

First Series.
Exercise 1.
COURSE I.

Position of attention, at the foot of the ladder, the toes touching it.

1. Raise the right hand and grasp the spar nearest the reach, the left following, the fingers and thumbs together; lift the right foot from the ground, and place it on the first spar, the left following, resting on the front of the foot, the toes pointed to the front, the column of the body and lower limbs straight but unconstrained, and inclined in the line of the ladder, the head erect, the eyes directed to the reach of the hands (Fig. 1).

Fig. 1.



2. Raise the right hand to the next spar, the left following, lift the right foot to the next spar, straighten the right knee, and lift the left foot to the next spar. Repeat.

In descending, slip the right foot down to the next spar, the left following, slip the right hand down to the next spar, the left following. Repeat.

This exercise to be repeated with the left hand leading.

This exercise to be repeated with the hands lightly grasping the sides of the ladder.

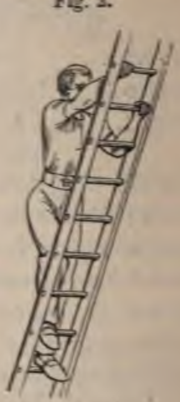
RIGHT SIDE LEADING.

First Series. Position as in first exercise.

Exercise 2. 1. As in first exercise.

COURSE I. 2. Raise the right hand to the next spar and at the same time lift the right foot to the next spar (Fig. 2), straighten the right knee and lift the left hand and left foot together to the same spar. Repeat.

Fig. 2.



In descending, slip the right hand down to the next spar, and at the same time slip the right foot down to the next spar, the left hand and left foot following. Repeat.

This exercise to be repeated with the left side leading.

This exercise to be repeated with the hands lightly grasping the sides of the ladder.

RIGHT AND LEFT SIDE.

First Series. Position as in first exercise.

Exercise 3. 1. As in first exercise.

COURSE I. 2. Raise the right hand to the next spar, and at the same time lift the right foot to the next spar, as in Fig. 2; straighten the right knee and at the same time raise the left hand to the spar above that grasped by the right, and lift the left foot to the spar *above* that occupied by the right. Repeat the step, the leading hand and foot always passing the spars occupied by the supporting hand and foot.

In descending, pass the leading hand down to the spar below that grasped by the supporting hand, and the leading foot to the spar below that occupied by the supporting foot. Repeat.

This exercise to be repeated with the hands lightly grasping the sides of the ladder.

RIGHT AND LEFT, HAND AND FOOT.

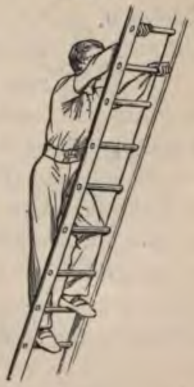
First Series. Position as in first exercise.

Exercise 4. 1. As in first exercise.

COURSE I. 2. Raise the right hand to the next spar and at the same time lift the left foot to the next spar (Fig. 3); straighten the left knee and at the same time raise the left hand to the spar above that grasped by the right, and lift the right foot to the spar above that occupied by the left. Repeat the step, the leading hand and foot always passing the spars occupied by the supporting hand and foot.

In descending, pass the leading hand to the spar below that grasped by the supporting hand, and the leading foot to the spar below that occupied by the supporting foot. Repeat.

Fig. 3.



This exercise to be repeated with the hands lightly grasping the sides of the ladder.

BOTH HANDS AT ONCE.

First Series.
Exercise 5.
COURSE II.

Position as in first exercise.

1. As in first exercise.

2. Raise both hands to the next spar; lift the right foot to the next spar, the left following. Repeat.

In descending, slip the right foot down to the next spar, the left following; slip both hands down to the next spar. Repeat.

This exercise to be repeated with the hands lightly grasping the sides of the ladder.

WITH ONE HAND.

First Series.
Exercise 6.
COURSE II.

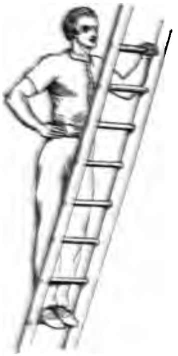
Position as in first exercise.

1. Place the left hand upon the hip joint, the fingers to the front, the thumb to the rear; raise the right hand and grasp the spar nearest the reach, lift the left foot and place it on the first spar, the right following (Fig. 4).

2. Raise the right hand to the next spar, lift the left foot to the next spar, straighten the left knee, elongate the trunk, and lift the right foot to the same spar. Repeat.

In descending, slip the left foot down to the next spar, the right following, slip the right hand down to the next spar. Repeat.

Fig. 4.



This exercise to be repeated with the left hand.

This exercise to be repeated with the hand lightly grasping the side of the ladder.

WITH THE FEET ONLY.

First Series.
Exercise 7.
COURSE III.

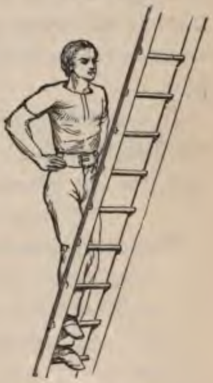
Position as in first exercise.

1. Place both hands on the hip joints, lift the right foot from the ground and place it on the first spar, the left following, the feet advanced on the spar so that the rest is nearly at the heel, and the front of the leg nearly touching the spars; the column of the body inclined to the front, the head in the same line and the eyes directed to the front.

2. Lift the left foot to the second spar (Fig. 5), straighten the left leg and at the same time lift the right foot to the same spar. Repeat.

In descending, slip the left foot down to the next spar, the right following. Repeat.

Fig. 5.



RIGHT HAND LEADING.

(BY THE SPARS.)

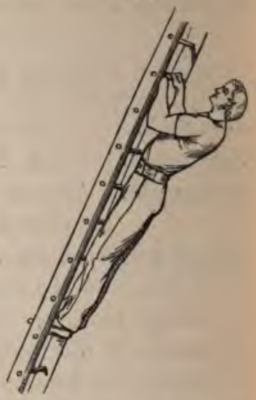
Second Series.
Exercise 8.
COURSE II.

Position of attention, under the ladder.

1. Raise the right hand and grasp the spar nearest the reach, the left following,

the fingers and thumb together; lift the right foot from the ground and place it on the nearest spar, the left following, straighten the knees, elongate the trunk, the arms bent at the half reach, the chest advanced, the body inclined in the line of, and close to the ladder, the head back, the eyes directed to the reach of the hands (Fig. 6).

Fig. 6.



2. Raise the right hand to the next spar, the left following; lift the right foot to the next spar, the left following, straighten the knees and elongate the trunk. Repeat.

In descending, slip the right foot down to the next spar, the left following; slip the right hand down to the next spar, the left following. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT SIDE LEADING.

(BY THE SPARS.)

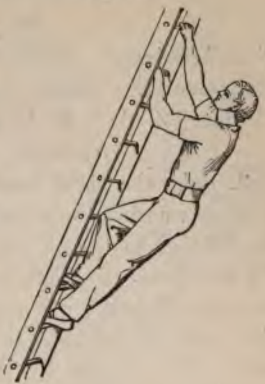
Second Series. Position as in eighth exercise.
ercise 9. 1. As in eighth exercise.
RSE II. 2. Raise the right hand to the next

spar, and at the same time lift the right foot to the next spar (Fig. 7), the left hand and foot following on the left. Repeat.

In descending, slip the right hand down to the next spar, and at the same time slip the right foot down to the next spar, the left hand and left foot following together to the same spars. Repeat.

This exercise to be repeated with the left side leading.

Fig. 7.



RIGHT AND LEFT SIDE.

(BY THE SPARS.)

Second Series.
Exercise 10.
COURSE II.

Position as in eighth exercise.

1. As in eighth exercise.

2. Raise the right hand to the next spar, and at the same time lift the right foot to the next spar, as in Fig. 7; straighten the right knee and at the same time raise the left hand to the spar above that grasped by the right, and lift the left foot to the spar above that occupied by the right. Repeat the step, the leading hand and foot always passing the supporting hand and foot.

In descending, pass the leading hand down to the spar below that grasped by the supporting hand, and the leading foot to the spar below that occupied by the supporting foot. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

(BY THE SPARS.)

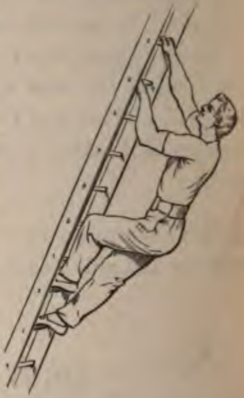
Second Series.
Exercise 11.
Course II.

Position as in eighth exercise.

1. As in eighth exercise.

2. Raise the right hand to the next spar and at the same time lift the left foot to the next spar (Fig. 8), straighten the left knee and elongate the trunk, and at the same time raise the left hand to the spar above that grasped by the right, and the right foot to the spar above that occupied by the left. Repeat the step, the leading hand and foot always passing the spars occupied by the supporting hand and foot.

Fig. 8.



In descending, slip the leading hand down to the spar below that grasped by the supporting hand, and the leading foot to the spar below that occupied by the supporting foot. Repeat.

BOTH HANDS AT ONCE.

(BY THE SPARS.)

Second Series.
Exercise 12.
Course III.

As in eighth exercise.

1. As in eighth exercise.

2. Raise both hands to the next spar and lift both feet to the next spar, straighten the knees and elongate the trunk. Repeat.

In descending, pass both feet down to the next spar, and pass both hands down to the next spar. Repeat.

In descending, pass the leading hand down to the rest, and at the same time slip the leading foot down to the spar below that occupied by the supporting foot. Repeat.

BOTH HANDS AT ONCE.

(BY THE SIDES.)

Second Series.
Exercise 17.
COURSE III.

Position as in eighth exercise.

1. As in thirteenth exercise.

2. Raise both hands to the reach, lift both feet to the next spar, straighten the knees and elongate the trunk. Repeat.

In descending, pass both feet down to the next spar, slip both hands down to the rest. Repeat.

RIGHT HAND LEADING.

(BY SPARS AND SIDES.)

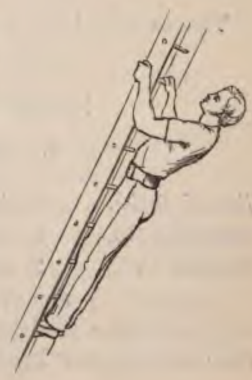
Second Series.
Exercise 18.
COURSE II.

Position as in eighth exercise.

1. As in eighth exercise, except that the leading hand grasps the spar, the supporting hand grasps the side of the latter (Fig. 10).

2. Raise the right hand to the next spar, raise the left hand the same distance on the side; lift the right foot to the next spar, the left following, straighten the knees and elongate the trunk. Repeat.

Fig. 10.



at the same time slip the right foot down to the next spar, the left hand and left foot following on the left. Repeat.

This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

(BY THE SIDES.)

Second Series.
Exercise 15.
COURSE II.

Position as in eighth exercise.

1. As in thirteenth exercise.

2. Raise the right hand to the reach, and at the same time lift the right foot to the next spar; straighten the right knee, and at the same time raise the left hand to the reach and lift the left foot to the spar above that occupied by the right. Repeat the step, the leading hand and foot always passing the supporting hand and foot.

In descending, pass the leading hand down to the rest, and at the same time slip the leading foot down to the spar below that occupied by the supporting foot. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

(BY THE SIDES.)

Second Series.
Exercise 16.
COURSE II.

Position as in eighth exercise.

1. As in thirteenth exercise.

2. Raise the right hand to the reach, and at the same time lift the left foot to the next spar; straighten the left knee and elongate the trunk, and at the same time raise the left hand to the reach nd the right foot to the spar above that occupied by the ght. Repeat the step, the leading hand and foot always ssing the supporting hand and foot.

In descending, pass the leading hand down to the rest, and at the same time slip the leading foot down to the spar below that occupied by the supporting foot. Repeat.

BOTH HANDS AT ONCE.

(BY THE SIDES.)

Second Series.
Exercise 17.
COURSE III.

Position as in eighth exercise.

1. As in thirteenth exercise.

2. Raise both hands to the reach, lift both feet to the next spar, straighten the knees and elongate the trunk. Repeat.

In descending, pass both feet down to the next spar, slip both hands down to the rest. Repeat.

RIGHT HAND LEADING.

(BY SPARS AND SIDES.)

Second Series.
Exercise 18.
COURSE II.

Position as in eighth exercise.

1. As in eighth exercise, except that the leading hand grasps the spar, the supporting hand grasps the side of the latter (Fig. 10).

2. Raise the right hand to the next spar, raise the left hand the same distance on the side; lift the right foot to the next spar, the left following, straighten the knees and elongate the trunk. Repeat.

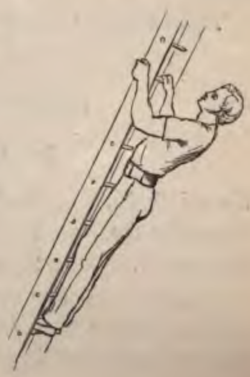


Fig. 10.

In descending, slip the right foot down to the next spar, the left following, slip the right hand down to the next spar, the left following on the side, the same distance. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT SIDE LEADING.

(BY SPARS AND SIDES.)

Second Series. Position as in eighth exercise.
Exercise 19. 1. As in eighteenth exercise.
COURSE II. 2. Raise the right hand to the next spar, and at the same time lift the right foot to the next spar, the left hand and left foot following the same distance. Repeat.

In descending, slip the right hand down to the next spar and at the same time slip the right foot down to the next spar, the left hand and left foot following the same distance. Repeat.

This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

(BY SPARS AND SIDES.)

Second Series. Position as in eighth exercise.
ise 20. 1. As in eighteenth exercise.
II. 2. Raise the right hand to the next spar, and at the same time lift the right foot to
par; straighten the right knee and at the same
the left hand the distance of the step above the

right and the left foot to the spar above that occupied by the right. Repeat the step, the leading hand and foot always passing the supporting hand and foot.

In descending, slip the leading hand and foot down the distance of the step below the supporting hand and foot. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

(BY SPARS AND SIDES.)

Second Series.
Exercise 21.
COURSE II.

Position as in eighth exercise.

1. As in eighteenth exercise.

2. Raise the right hand to the next spar, and at the same time lift the left foot to the next spar; raise the left hand the distance of the step above the right, and the right foot to the spar above that occupied by the left. Repeat the step, the leading hand and foot always passing the supporting hand and foot.

In descending, slip the leading hand and foot down the distance of the step below the supporting hand and foot. Repeat.

BOTH HANDS AT ONCE.

(BY SPARS AND SIDES.)

Second Series.
Exercise 22.
COURSE III.

Position as in eighth exercise.

1. As in eighteenth exercise.

2. Raise both hands the distance of the step, the right grasping the next spar, the left grasping the side; lift both feet to the next spar, straighten the knees and elongate the trunk. Repeat.

In descending, slip both hands down the distance of the step, pass both feet down to the next spar. Repeat.

RIGHT HAND LEADING.

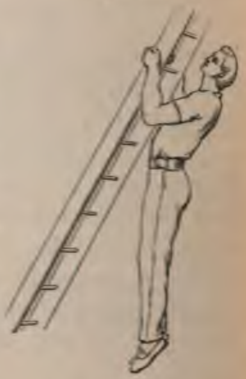
(BY THE SIDES.)

Third Series.
Exercise 23.
COURSE III.

Position as in seventh exercise.

1. Raise the right hand to the reach and grasp the side of the ladder, the left following on the left, the fingers and thumbs meeting; bend the arms to the half reach, lifting the feet from the ground, the legs straight and together, the toes pointed downwards, the trunk of the body upright, the neck free, the head held back, the eyes directed to the reach of the hands (Fig. 11).

Fig. 11.



2. Raise the right hand to the reach, the left following on the left; bend the arms to the half reach, retaining the trunk and lower limbs in position. Repeat.

In descending, slip the right hand down to the rest, the left following on the left. Repeat.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

(BY THE SIDES.)

ird Series.
ercise 24.
RSE III.

Position as in eighth exercise.

1. As in twenty-second exercise.

2. Raise the right hand to the reach,

BOTH HANDS AT ONCE.

(BY THE SPARS.)

Third Series.
Exercise 28.
Course IV.

Position as in eighth exercise.

1. As in twenty-fifth exercise.

2. Shoot up both hands to the next spar, retaining the arms bent, and the trunk and lower limbs in position. Repeat.

In descending, slip both hands down to the next spar. Repeat.

RIGHT HAND LEADING.

(BY SPARS AND SIDES.)

Third Series.
Exercise 29.
Course III.

Position as in eighth exercise.

1. As in twenty-third exercise, except that the right hand grasps the spar, the left hand grasps the side of the ladder, opposite the right.

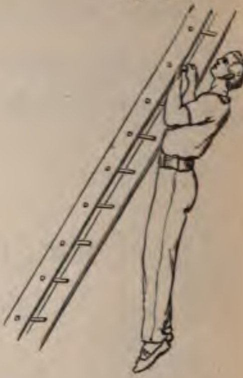
2. Raise the right hand to the next spar, the left following the same distance on the side. Repeat.

In descending, slip the right hand down to the next spar, the left following the same distance on the side. Repeat.

This exercise to be repeated with the left hand leading and grasping the spar, the right hand on the side.

arms to the half reach, lifting the feet from the ground, the trunk and lower limbs as in twenty-first exercise (Fig. 12).

Fig. 12.



2. Raise the right hand to the next spar, the left following, bend the arms to the half reach, retaining the trunk and lower limbs in position. Repeat.

In descending, slip the right hand down to the next spar, the left following. Repeat.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

(BY THE SPARS.)

Third Series.
Exercise 27.
COURSE III.

Position as in eighth exercise.

1. As in twenty-fifth exercise.

2. Raise the right hand to the next spar, bend the right arm and on the instant raise the left hand to the spar above that grasped by the ght. Repeat, the leading hand always passing the spar asped by the supporting hand.

In descending, slip the leading hand down to the spar ow that grasped by the supporting hand. Repeat.

BOTH HANDS AT ONCE.

(BY THE SPARS.)

Third Series.
Exercise 28.
COURSE IV.

Position as in eighth exercise.

1. As in twenty-fifth exercise.

2. Shoot up both hands to the next spar, retaining the arms bent, and the trunk and lower limbs in position. Repeat.

In descending, slip both hands down to the next spar. Repeat.

RIGHT HAND LEADING.

(BY SPARS AND SIDES.)

Third Series.
Exercise 29.
COURSE III.

Position as in eighth exercise.

1. As in twenty-third exercise, except that the right hand grasps the spar, the left hand grasps the side of the ladder, opposite the right.

2. Raise the right hand to the next spar, the left following the same distance on the side. Repeat.

In descending, slip the right hand down to the next spar, the left following the same distance on the side. Repeat.

This exercise to be repeated with the left hand leading and grasping the spar, the right hand on the side.

HAND OVER HAND.

(BY SPARS AND SIDES.)

Third Series.
Exercise 30.
COURSE III.

Position as in eighth exercise.

1. As in twenty-ninth exercise.

2. Raise the right hand to the next spar, bend the right arm and on the instant raise the left hand to the reach beyond the right. Repeat, the leading hand always passing the supporting hand.

In descending, slip the right hand down to the next spar below the left, slip the left down below the right. Repeat.

This exercise to be repeated, the left hand grasping the spar, the right hand on the side.

BOTH HANDS AT ONCE.

(BY SPARS AND SIDES.)

Third Series.
Exercise 31.
COURSE IV.

Position as in eighth exercise.

1. As in twenty-ninth exercise.

2. Shoot up both hands the distance of the step (the distance between the spars), the right grasping the next spar, the left grasping the side of the ladder, opposite the right. Repeat.

In descending, slip both hands down the distance of the step, as in the ascent. Repeat.

s exercise to be repeated, the left hand grasping the he right hand on the side.

LEFT HAND LEADING.

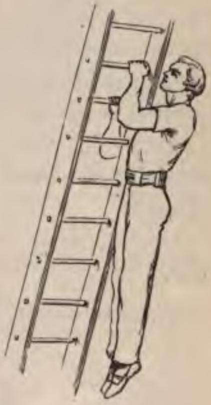
(SIDEWAYS.)

Third Series.
Exercise 32.
COURSE III.

Position of attention, the ladder in profile on the left.

1. Raise the right hand and passing it above the ladder, grasp the spar nearest the reach, the fingers and thumb meeting, raise the left hand and passing it under the ladder, grasp the spar above that grasped by the right; bend the arms and lift both feet from the ground, the legs straight and together, the toes pointed downwards, the trunk of the body upright, the neck free, the head slightly held back, the eyes directed to the reach of the hands (Fig. 13).

Fig. 13.



2. Raise the left hand to the next spar, raise the right hand to the next spar. Repeat.

In descending, pass the right hand down to the next spar, pass the left hand down to the next spar. Repeat.

This exercise to be repeated with the right hand leading.

HAND OVER HAND.

(SIDEWAYS.)

Third Series.
Exercise 33.
COURSE IV.

Position as in thirty-second exercise.

1. As in thirty-second exercise.
2. Raise the right hand to the spar above

that grasped by the left, elevate the body and raise the left hand to the spar above that grasped by the right. Repeat.

In descending, pass the leading hand down to the spar below that grasped by the supporting hand. Repeat.

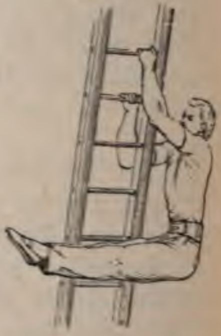
RIGHT HAND LEADING.

(SIDEWAYS. LEGS UP.)

Third Series.
Exercise 34.
COURSE III.

Position as in thirty-second exercise.

Fig. 14.



1. As in thirty-second exercise, except that in lifting the feet from the ground they are to be extended to the front horizontally, the legs straight and together, the toes pointed to the front (Fig. 14).

2. As in thirty-second exercise, retaining the lower limbs in position. Repeat.

Descend as in thirty-second exercise.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

(SIDEWAYS. LEGS UP.)

Third Series.
xercise 35.
OURSE IV.

Position as in thirty-second exercise.

1. As in thirty-fourth exercise.

2. As in twenty-fifth exercise, retaining the lower limbs in position. Repeat.

Descend as in thirty-third exercise.

RIGHT HAND LEADING.

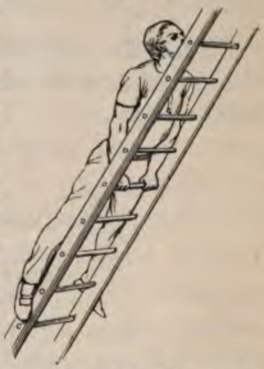
(ABOVE THE LADDER.)

Third Series.
Exercise 36.
COURSE IV.

Position as in first exercise.

1. Raise both hands and grasp the spar nearest the reach, the fingers and thumb meeting; press strongly from the hands and straightening the arms, lift both feet from the ground and pass them right and left outside the ladder, the inside of the foot lightly pressing against the supports, the legs straight, the toes pointed downwards, the chest advanced, the head slightly bent back (Fig. 15).

Fig. 15.



2. Raise the right hand to the next spar, straighten the right arm, raise the left hand to the same spar. Repeat.

In descending, slip the right hand down to the next spar, the left following. Repeat.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

(ABOVE THE LADDER.)

Third Series.
Exercise 37.
COURSE IV.

Position as in first exercise.

1. As in thirty-sixth exercise.

2. Raise the right hand to the next spar, straighten the right arm and on the instant

which both the upper and lower limbs and trunk aid in the ascent; the second, those in which the ascent is accomplished by the action of the upper limbs alone.

The wall should not be less than 12 feet or more than 18 feet high; the face of it being closely boarded. The first division should have a series of holes cut through the boarding, 15 inches apart in width and 9 inches apart in height. The second should have projecting blocks screwed on the boarding and arranged at the same distances apart as the holes. The third should have 1½ inch boards 11 inches wide screwed on the face boarding, with a space of 1½ inch between the boards, thus forming grooves. This division should not be less than 6 feet in length, and may be as much longer as is convenient, giving facilities for several men ascending together keeping step and time.

FIRST SERIES . . . . . . *With hands and feet.*
SECOND SERIES . . . . *With hands only.*

RIGHT HAND LEADING.

First Series.
Exercise 1.
COURSE I.

Position of attention, facing the wall, the toes touching it.

1. Raise the right hand and grasp the ledge of the groove nearest the reach, the *left* following at the distance to the same groove; lift the

right foot from the ground and rest the point of the foot in the first groove, the left following to the same groove, the toes slightly turned outwards; straighten the knees and elongate the trunk to the half reach of the hands, the whole column of the body held firm and upright, the legs together, the loins and hips pressed inwards, the chest advanced and held close to the wall, the shoulders flat, the head slightly held back, the eyes directed to the reach of the hands (Fig. 1).

2. Raise the right hand to the next groove (Fig. 2), the left following at the distance; raise the right foot and rest it in the second groove, the left following; straighten the knees and elongate the trunk. Repeat.

Fig. 1.

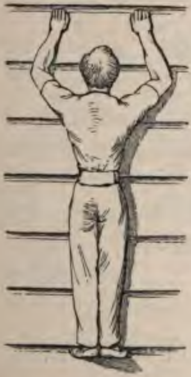
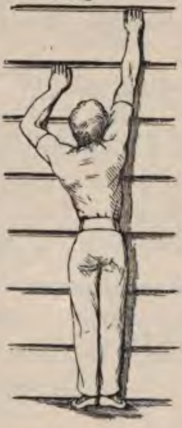


Fig. 2.



In descending, slip the right foot down to the next groove, the left following; slip the right hand down to the next groove, the left following. Repeat.

This exercise to be repeated with the left hand leading.

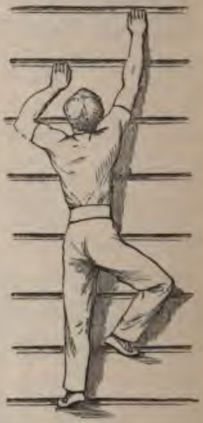
THE RIGHT SIDE LEADING.

First Series. Position as in first exercise.
Exercise 2. 1. As in first exercise.
COURSE I. 2. Raise the right hand to the next groove, and at the same time lift the right foot to the next groove (Fig. 3), the left hand and left foot following together the same distance; straighten the knees and elongate the trunk. Repeat.

In descending, slip the right hand down to the next groove, and at the same time slip the right foot down to the next groove, the left hand and left foot following together the same distance. Repeat.

This exercise to be repeated with the left side leading.

Fig. 3.



RIGHT AND LEFT SIDE.

First Series. Position as in first exercise.
Exercise 3. 1. As in first exercise.
COURSE I. 2. Raise the right hand to the next groove, and at the same time lift the right foot to the next groove, as in Fig. 3; straighten the right knee, bend the right arm, and elongate the trunk, and at the same time raise the left hand to the groove above that occupied by the right, and lift the left foot to the groove

above that occupied by the right. Repeat the step, the leading hand and foot always passing the grooves occupied by the supporting hand and foot.

In descending, slip the leading hand down to the groove below that occupied by the supporting hand, and the leading foot to the groove below that occupied by the supporting foot. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

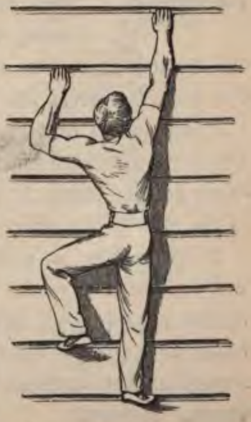
First Series.
Exercise 4.
COURSE I.

Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the next groove, and at the same time lift the left foot to the next groove (Fig. 4); straighten the left knee, bend the right arm, and elongate the trunk, and at the same time raise the left hand to the groove above that occupied by the right, and lift the right foot to the groove above that occupied by the left. Repeat the step, the leading hand and foot always passing the grooves occupied by the supporting hand and foot.

Fig. 4.



In descending, slip the leading hand down to the groove below that occupied by the supporting hand, and at the same time slip the leading foot down to the groove below that occupied by the supporting foot. Repeat.

BOTH HANDS AT ONCE.

First Series. Position as in first exercise.
Exercise 5. 1. As in first exercise.
COURSE II. 2. Shoot up both hands to the next groove; lift both feet, without bending the arms, and rest them in the next groove; straighten the knees and elongate the trunk. Repeat.

In descending, slip both feet down to the next groove, retaining the lower limbs in position, slip both hands down to the next groove. Repeat.

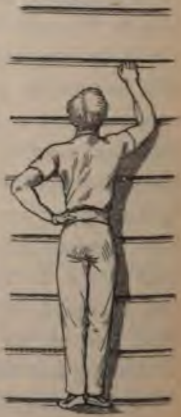
WITH ONE HAND.

First Series. Position as in first exercise.
Exercise 6. 1. Place the left hand on the hip joint,
COURSE III. the thumb to the rear, the fingers to the front; raise the right hand to the groove nearest the reach, lift the left foot to the first groove, the right following; straighten the knees and elongate the trunk to the half reach of the right hand (Fig. 5).

2. Press the body close in to the wall and instantly raise the right hand to the next groove, lift the left foot to the next groove, the right following, straighten the knees and elongate the trunk. Repeat.

In descending, slip the left foot

Fig. 5.



down to the next groove, the right following; slip the right hand down to the next groove. Repeat.

This exercise to be repeated with the left hand.

RIGHT HAND LEADING.

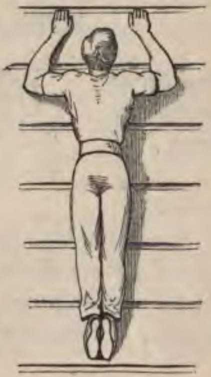
Second Series.
Exercise 7.
COURSE IV.

Position as in first exercise.

1. Raise the right hand and grasp the ledge of the groove nearest the reach, the left following at the distance to the same groove; bend the arms to the half reach of the hands, lifting the feet from the ground, the lower limbs pendent, the toes pointed downwards, the legs straight and together, touching the wall, the trunk of the body held firm and upright, the head slightly held back, the eyes directed to the reach of the hands (Fig. 6).

2. Raise the right hand to the next groove, the left following to the same groove; bend the arms and raise the body to the half reach of the hands. Repeat.

Fig. 6.



In descending, slip the right hand down to the next groove, the left following at the distance, retaining the arms bent at the half reach. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT AND LEFT.

Second Series.
Exercise 8.
COURSE IV.

Position as in first exercise.

1. As in seventh exercise.

2. Raise the right hand to the next groove and elevate the body to the rest of the left hand, and on the instant raise the left hand to the groove above that occupied by the right. Repeat, the leading hand always passing the groove occupied by the supporting hand.

In descending, slip the leading hand down to the groove below that occupied by the supporting hand. Repeat.

BOTH HANDS AT ONCE.

Second Series.
Exercise 9.
COURSE IV.

Position as in first exercise.

1. Raise both hands to the groove nearest the reach, bend the arms to the half reach, the body and lower limbs as in seventh exercise.

2. Shoot up both hands to the next groove, bend the arms and elevate the body to the rest of the hands. Repeat.

At the last step rest both feet on the nearest groove and descend as in fifth exercise.

SECTION IV.

CLIMBING.

An upright object presents itself as the most perfect form of machine to be ascended by climbing, and the hands are the chief agent in affecting the ascent, for they not only aid in the execution of every exercise, simple or difficult, in which the feet take a share, but there is a large series embracing the most difficult and artistic exercises, in which the body is sustained and elevated by the hands alone.

Following out this idea, a perfectly vertical object, of girth capable of being grasped by the hand, may be viewed as the typical machine for climbing. But this simple description of machine instantly takes a dual form from the nature of the material of which it is constructed; it is either hard and firm, like the wooden pole affording unyielding fulcra to the muscles of the hands in their grasp, and to those of the feet in their clasp, or it is soft and pliable like the hempen rope, the characteristics of which are the reverse of these.

We have thus at the very outset two machines, giving origin to the two divisions of machines employed in this section, the one being the single upright pole, fixed or suspended, and the other, its companion machine, the single rope similarly placed; and all deviations from these two, either in dimensions, number, or position, are but modifications of them, designed for special purposes.

Where the single pole is retained, and its dimensions only are altered, every gradation of size may be obtained until the girth of the mast is reached, the exercises being modified or changed with the alteration in the dimensions of the machine. Where the single pole is retained, and its position changed for the inclined one, the exercises again change, taking a range both wide and varied; and when the pole, from being fixed, is made to turn on its axis, again the exercises, in action and position, in nature and purpose, change also.

The first division, springing from the slender, upright pole, branches first into the pair of poles, arranged in such a position as to present one to each hand about the width of the shoulders apart, the body to be sustained between the two, and from this arrangement springs an arduous series of exercises; next, into those poles which, being inclined, present a long series of simple exercises, the altered position of the poles altering the entire character of the exercises to be executed upon them.

The second branch, springing from the single vertical rope, also takes a very extended form. A double rope is not accepted, as yielding no exercise sufficiently removed from those on the pair of poles to justify its adoption as a separate machine. A wider range of exercises, in which the lower limbs also are employed, is afforded by the rope than by the pole, and those in which the hands alone sustain and elevate the body are all a degree harder than the corresponding ones on its companion machine. The single rope may be simple or knotted, the knots being formed in the rope itself, or superadded; and every change will to some extent enlarge the range of the exercises, qualify their difficulty, and vary the parts of the body required for their execution.

The position varies but little throughout the section with regard to the trunk of the body, because it is determined by principles which are equally important in every exercise, viz. to set the limbs free from the due execution of the movements of the step, to preserve the equilibrium, and to give full scope to respiration; but with regard to the limbs, it is varied in every exercise on each machine.

In the initiatory practice, the instructor should count the time for the learner,—one, two, three,—for the three separate movements of the step, at a pace proportionate to his ability, taking care that each step is of the same length, and executed at the same speed as the others; perfect cadence and rhythm should accompany the whole of each exercise, both in the ascent and descent.

The initiatory practice should consist of brief efforts, and the instructor should give the 'halt' on the slightest indication of exhaustion or insecurity of grasp; a pause, less or more protracted, should always follow the halt, and as much care should be given to the descent as to the ascent; the last step should be as carefully completed as any in the exercise, the feet should be set leisurely upon the ground, and the grasp of the hands quietly relinquished, the movement being closed in the original position of 'attention,' and place immediately given to another climber.

The instructor should also carefully impress upon the learner the desirability of executing every exercise quietly and steadily, of keeping the countenance quiet even under the most severe efforts, and of never, on any occasion, speaking while executing an exercise himself, or of addressing any one else who is doing so.

On the other hand, so long as proper care and attention are given to the exercises, and full regard is paid to the directions of the instructor, an outward expression of pleasure and interest among the learners is to be encouraged rather than checked; and the slips and mishaps of beginners, in certain exercises where no attendant danger is to be dreaded, are legitimate sources of amusement; its proper bounds being always a matter of calculation with the instructors.

THE VERTICAL POLE.

It is characteristic of simple climbing, i. e. that form of climbing in which all the resources of the body capable of aiding in the ascent are called into action, that the upper and lower limbs and trunk all receive a fair share of well-distributed employment. The first series gives the same employment in every exercise to the lower half of the body, with a different mode of employment to the upper, in each separate one. In the first exercise (which is considered the easiest mode of ascent, because neither hand is ever separated for a moment from the pole, while both are acting during the elevation of the body which completes each step), one side of the body leads throughout the ascent, and the other throughout the descent. In an elementary sense this feature can be turned to great advantage if one side of the body be weaker than the other, by giving that side the lead, and consequently the largest share of employment; in a practical sense by making the strongest and most dexterous member the leading one, and consequently the chief agent in the ascent. In the next form, where the action is alternated right and left, the equalization of the body is preserved on the same principle as in certain exercises in the preceding section, from the fact that both sides are separately, and each for itself and by itself, doing the same amount of work, and therefore the weaker side, being the weaker, is virtually doing more,—is being urged to greater activity, reaping a proportionately greater advantage. Here each hand, during its elevation, entirely quits the pole, and the body is raised on the elevation of each. In the fourth exercise both hands act together, both in the ascent and descent, thus both quitting the pole at the same instant.

In all these exercises the column of the body is maintained in the position most favourable to free respiration.

The instructor should take care that the learner places his hands and feet in their proper order and position in commencing each exercise; the leading arm should be completely extended to the reach at each step, and the arms must not be bent when the feet are lifted, but only when the elongation of the legs and trunk renders it necessary in the third movement of the step. Beginners frequently try to struggle up the machine by means of the hands only, the instructor should therefore carefully explain to them how one part of the body assists the other in making the ascent, and how, upon the correct employment of these various parts, the facility and elegance of climbing depend. When the feet are lifted in the second movement, he upper part of the body must not be allowed to incline backwards, but the back must be bent outwards.

In the third movement, the legs and trunk must be straightened without jerk, and the whole body be kept as close to the pole as possible. In the descent, the legs and trunk should be kept straight throughout, the body being sustained by the legs during the movements of the hands.

In the second exercise, the upper part of the body must not be allowed to sway too much from side to side, which is apt to result from the separate employment of the hands; and in the descent the moving hand should not be placed until the opposite arm is perfectly extended.

The second series of exercises on this machine is of a much more arduous character than the first. In the former the upper limbs take up and repeat the action of the latter, but they are entirely unaided by the lower limbs and trunk, and in some exercises the position of these is chosen for its value in an elementary sense, its object being to heighten the difficulty of the exercise, and to intensify the action of the upper part of the body, by acting strongly against it.

In the first exercise of this series, the lower half of the body is merely held quiescent, and in the position most favourable to the ascent; in the second, it is held formally in the line of the machine; and in the third, the same formality of position is preserved with the lower half, while the upper is employed in rapid action, elevating the whole.

The elementary value of this second series is very great, developing powerfully not only the muscular energies of the arms and upper portion of the trunk, but the tenacity and security of the grip of the hands, and the facility and readiness of action of the upper limbs, either in separate or combined effort. The single exercise of the third series may be viewed as the culminating one on this machine.

In performing the exercises the learner must be instructed not to allow the left side to sway round to the left side of the pole; but the hands must ascend and descend in a straight line, and the same side of the pole be retained throughout. In the second exercise, beginners are very apt to make a more complete step with the left hand than with the right, because they are better able to support themselves with the right while the left moves, and for the same reason to allow the left arm to relax while the right moves, so that special attention is required to ensure an equal step with each hand. In the fourth exercise the body must not be allowed to recede as the hands are moved, and the movement of these must therefore take place before the flexion of the arms is quite complete.

In the last exercise a strong pressure of the feet will required to prevent the body from receding as the nd is raised to the reach, and the upper part of the body must be kept as close as possible to the pole throughout.

During the first few steps, the position of the instructor should be where he can best observe the movements of the climber; afterwards, his position should be behind the climber on the left, that he may be able to interpose his right hand in the event of a slip.

The Vertical Pole may be of any height from 15 feet to 30 feet, and there should be in a gymnasium three or four of different diameter, viz. 2 inches, 2½ inches, and 3 inches.

FIRST SERIES . . . . . . *With hands and feet.*
SECOND SERIES . . . . *With hands only.*

RIGHT HAND LEADING.

First Series.
Exercise 1.
COURSE I.

Position of attention, facing the pole.

1. Raise the right hand to the reach and grasp the pole, the left following (Fig. 1); lift the right foot from the ground and place it against the left side of the pole, the knee on the right side (Fig. 2); lift the left foot and place it in front of the pole, the ankles crossing, the outside edges of the feet together, the pole between them (Fig. 3); straighten the legs and elongate the trunk; the whole column of the body upright, the chest advanced, the shoulders flat, the elbows in by the sides, the hands at the half reach, the neck free,

the head slightly held back, the chin elevated, the eyes directed to the reach of the hands (Fig. 4).

Fig. 1.

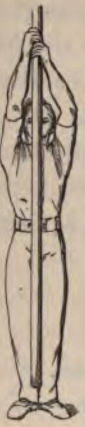


Fig. 2.

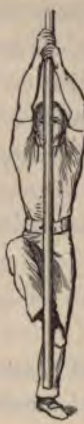


Fig. 3.

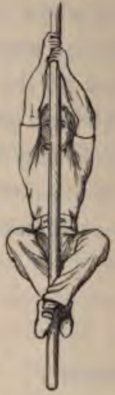
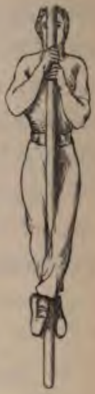


Fig. 4.



2. Raise the right hand to the reach and grasp the pole, the left following; draw up the lower limbs without relinquishing their clasp of the pole, allowing it, as it were, merely to slip between, and without bending the arms, as in Fig. 3; tighten the clasp of the feet when elevated, straighten the knees and elongate the trunk to the rest of the hands, as in Fig. 4. Repeat.

In descending, slip the left hand down to the rest and grasp the pole, the right following; slacken the clasp of the lower limbs, lower the body to the reach of the hands, retaining the legs straight and the pole between them. Repeat.

This exercise to be repeated with the left hand leading, the relative positions of the feet reversed.

HAND OVER HAND.

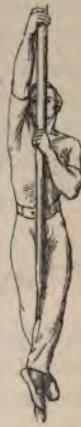
t Series.
rcise 2.
RSE I.

Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach and grasp the pole
. 5), draw up the lower limbs without bend-
the right arm, straighten the legs, and
gate the trunk to the rest of the right arm.
eat, raising the left hand to the reach ; the
t and left hand alternating throughout.
ı descending, slip the leading hand down to
rest and grasp the pole, lower the body
he reach of the supporting hand, the rest
he body as in first exercise. Repeat.

Fig. 5.



HAND OVER HAND.

(A SECOND METHOD.)

t Series.
rcise 3.
RSE I.

Position as in first exercise.

1. As in first exercise.

2. Raise the left hand to the half reach above the right, and raise the right to the
h above the left, draw up the lower limbs, straighten
egs, and elongate the trunk. Repeat.
escend as in second exercise.

BOTH HANDS AT ONCE.

Series.
rcise 4.
SE II.

Position as in first exercise.

1. Raise both hands to the reach and grasp the pole ; lift both feet from the

ground and clasp the pole in the position of first exercise, bringing the hands to the half reach, as in Fig. 4, the rest of the body as in first exercise.

2. Shoot up both hands to the reach, draw up the lower limbs without bending the arms, straighten the knees and elongate the trunk. Repeat.

In descending, slip both hands down to the rest and grasp the pole, lower the body to the reach of the hands, the rest of the body as in first exercise. Repeat.

WITH ONE HAND.

First Series.
Exercise 5.
COURSE IV.

Position as in first exercise.

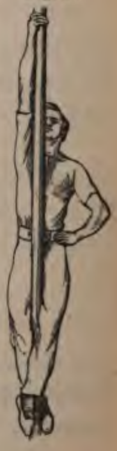
1. Raise the right hand to the reach and grasp the pole; spring from the ground and clasp the pole with the feet as in first exercise, bringing the right hand to the half reach; place the left hand on the hip joint, the fingers to the front, the thumb to the rear, the rest of the body in the position of first exercise.

2. Tighten the clasp of the feet, raise the right hand to the reach (Fig. 6), draw up the lower limbs without bending the arm, straighten the knees and elongate the trunk. Repeat.

In descending, slip the right hand down to the rest, lower the body to the half reach of the hand. Repeat.

This exercise to be repeated with the left hand.

Fig. 6.



HAND OVER HAND.

First Series.
Exercise 2.
COURSE I.

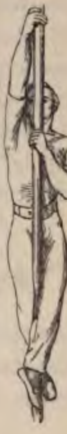
Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach and grasp the pole (Fig. 5), draw up the lower limbs without bending the right arm, straighten the legs, and elongate the trunk to the rest of the right arm. Repeat, raising the left hand to the reach; the right and left hand alternating throughout.

In descending, slip the leading hand down to the rest and grasp the pole, lower the body to the reach of the supporting hand, the rest of the body as in first exercise. Repeat.

Fig. 5.



HAND OVER HAND.

(A SECOND METHOD.)

First Series.
Exercise 3.
COURSE I.

Position as in first exercise.

1. As in first exercise.

2. Raise the left hand to the half reach above the right, and raise the right to the reach above the left, draw up the lower limbs, straighten the legs, and elongate the trunk. Repeat.

Descend as in second exercise.

BOTH HANDS AT ONCE.

First Series.
Exercise 4.
COURSE II.

Position as in first exercise.

1. Raise both hands to the reach and grasp the pole; lift both feet from the

ground and clasp the pole in the position of first exercise, bringing the hands to the half reach, as in Fig. 4, the rest of the body as in first exercise.

2. Shoot up both hands to the reach, draw up the lower limbs without bending the arms, straighten the knees and elongate the trunk. Repeat.

In descending, slip both hands down to the rest and grasp the pole, lower the body to the reach of the hands, the rest of the body as in first exercise. Repeat.

WITH ONE HAND.

First Series.
Exercise 5.
COURSE IV.

Position as in first exercise.

1. Raise the right hand to the reach and grasp the pole; spring from the ground and clasp the pole with the feet as in first exercise, bringing the right hand to the half reach; place the left hand on the hip joint, the fingers to the front, the thumb to the rear, the rest of the body in the position of first exercise.

2. Tighten the clasp of the feet, raise the right hand to the reach (Fig. 6), draw up the lower limbs without bending the arm, straighten the knees and elongate the trunk. Repeat.

In descending, slip the right hand down to the rest, lower the body to the half reach of the hand. Repeat.

This exercise to be repeated with the *left hand.*

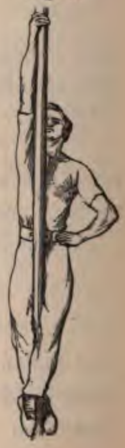


Fig. 6.

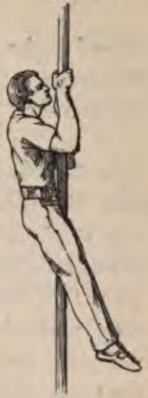
RIGHT HAND LEADING.

Second Series. Position as in first exercise.

Exercise 6. 1. Raise the right hand

COURSE III. to the reach and grasp the pole, the left following; lift both feet from the ground and pass them to the right side of the pole, the hands at the half reach, the left thigh slightly pressing against it; the legs together and straight and slanting to the front, the toes pointed in the same direction, the trunk of the body held firm and upright, the chest advanced, the shoulders flat, the elbows in by the sides, the head slightly held back, the eyes directed to the reach of the hands (Fig. 7).

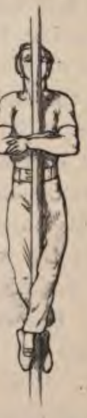
Fig. 7.



2. Raise the right hand to the reach and grasp the pole, the left following; elevate the body to the half reach of the hands. Repeat. At the last step, clasp the pole with the feet as in first exercise.

In descending, grasp the pole firmly with the left hand, and pass the right outside the pole over to the left breast, against which press the open palm (Fig. 8); pass the left outside of these, and with the open palm press the outside of the right fore-arm. By the clasp of the feet and the pressure of the arms guide the rate of descent.

Fig. 8.



This exercise to be repeated with the lower limbs on the left side of the pole.

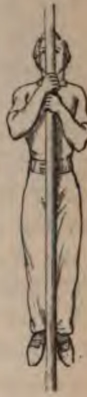
These exercises to be repeated with the left hand leading.

HAND OVER HAND.

Second Series.
Exercise 7.
COURSE III.

Position as in first exercise.

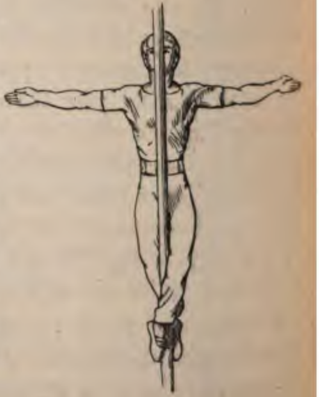
Fig. 9.



1. Raise the right hand to the reach and grasp the pole, the left following; lift both feet from the ground, raising the body until the hands are at the half reach; the legs straight and together, the toes pointed downwards, and slightly turned out (the pole lying free between them), the column of the body perfectly upright and in the line of the pole, the head erect, the eyes directed to the reach of the hands (Fig. 9).

2. Raise the right hand to the reach, elevating the body to the rest of the left; raise the left hand to the reach, elevating the body to the rest of the right. Repeat. At the last step clasp the pole with the feet, as in first exercise.

Fig. 10.



In descending, remove the hands from the pole and extend the arms horizontally to the side, right and left, the fingers together, the palms to the front (Fig. 10). Guide the descent by the pressure of the lower limbs.

BOTH HANDS AT ONCE.

Second Series. Position as in first exercise.

Exercise 8. 1. Raise both hands to the reach and grasp the pole, the rest of the body as in sixth exercise.

COURSE III.

2. Shoot up both hands to the reach and grasp the pole, elevate the body to the half reach of the hands. Repeat.

In descending, slip both hands down to the rest and grasp the pole, lower the body to the half reach of the hands. Repeat.

THE VERTICAL POLE.

(FIXED CLOSE TO A WALL.)

THE difficulty of the exercises on this machine in this position is almost solely owing to its position against a wall, whereby the freedom of the hand-grasp and the clasp of the lower limbs are entirely lost. All its exercises are of the most arduous description, and can only be accomplished after the hand and fore-arm have been strengthened by similar but less difficult exercises.

This machine is a pole, 3 inches in diameter, fixed within 1½ inch of the face of a wall by means of small wooden blocks at intervals behind it. It may be fixed on part of the front of the Prepared Wall.

FIRST SERIES. . . . . *Hands and feet.*
SECOND SERIES . . . . . . *Hands and knees.*

RIGHT HAND LEADING.

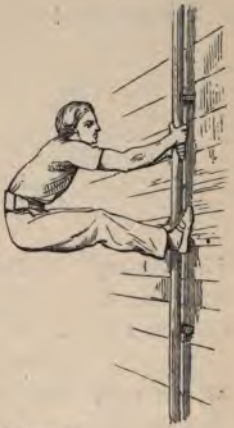
First Series.
Exercise 1.
COURSE IV.

Position of attention, facing the wall, the toes touching it.

1. Raise the right hand to the reach and grasp the pole, the fingers and thumb

meeting, the left following close under it; lift the right foot from the ground and place it flat upon the wall as high as the hip, on the right side of, and close to, the pole, the left following on the left (Fig. 1).

Fig. 1.



2. Slightly incline the body to the left front, raise the right hand to the reach, incline the body to the right front, raise the left hand to the reach, grasp strongly with both hands, lift the right foot the distance of the step, the left following on the left. Repeat.

In descending, slip the left foot down the distance of the step, the right following; slip the left hand down to the rest, the right following. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT SIDE LEADING.

First Series. Position as in first exercise.

Exercise 2. 1. As in first exercise.

Course IV. 2. Slightly incline the body to the left front, raise the right hand to the reach and at the same time lift the right foot the distance of the step; the left hand and left foot following together the same distance. Repeat.

In descending, slightly incline the body to the left front, slip the right hand down to the rest and at the same time slip the right foot down the same distance. **Repeat.**

This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

First Series.
Exercise 3.
Course IV.

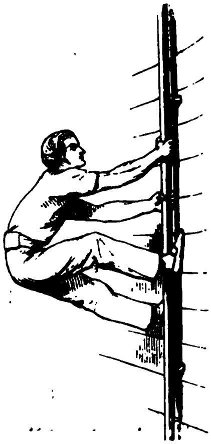
Position as in first exercise.

1. As in first exercise.

2. Slightly incline the body to the left front, raise the right hand to the reach and at the same time lift the right foot the distance of the step (Fig. 2); incline the body to the right front, raise the left hand to the reach above the right and at the same time lift the left foot the distance of the step beyond the right. Repeat.

In descending, incline the body to the supporting side, pass the leading hand down to the rest and at the same time slip the leading foot down the distance of the step. Repeat.

Fig. 2.



RIGHT AND LEFT, HAND AND FOOT.

First Series.
Exercise 4.
Course IV.

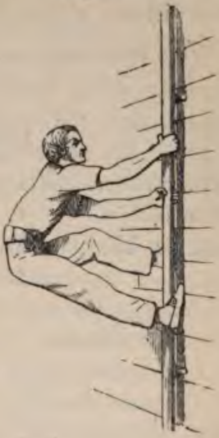
Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach and at the same time lift the left foot the distance of the step (Fig. 3); raise the left hand to the reach and at the same time lift the right foot the distance of the step. Repeat.

In descending, pass the leading hand down to the rest, and at the same time slip the leading foot down the distance of the step. Repeat.

Fig. 3.



RIGHT HAND LEADING.

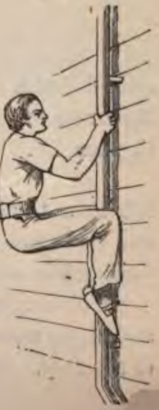
Second Series.
Exercise 5.
Course IV.

Position as in first exercise.

1. Raise the right hand to the reach and grasp the pole, the left following close under it; spring from the ground and bring both knees against the wall, as high as the waist, one on each side of the pole, touching it (Fig. 4).

2. Raise the right hand to the reach, the left following, grasp strongly with the hands and spring upwards from both knees. Repeat.

Fig. 4.



In descending, slip the left hand down to the rest, the right following, grasp strongly and slip both knees down the distance of the step. Repeat.

This exercise to be repeated with the left hand leading.

RIGHT SIDE LEADING.

Second Series. Position as in first exercise.
Exercise 6. 1. As in fifth exercise.
COURSE IV. 2. Raise the right hand to the reach and at the same time lift the right knee the distance of the step; the left hand and left knee following the same distance. Repeat.

In descending, slip the right hand down to the rest, and at the same time slip the right knee down the same distance, the left hand and knee following together on the left. Repeat.

This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

Second Series. Position as in first exercise.
Exercise 7. 1. As in fifth exercise.
COURSE IV. 2. Raise the right hand and knee as in preceding exercise; raise the left hand and left knee the distance of the step beyond the right hand and right knee. Repeat, the leading hand and knee always passing the supporting hand and knee.

In descending, pass the leading hand down to the rest, and at the same time slip the leading knee down the distance of the step. Repeat.

RIGHT AND LEFT, HAND AND KNEE.

Second Series.
Exercise 8.
COURSE IV.

Position as in first exercise.

1. As in fifth exercise.

2. Raise the right hand to the reach and at the same time lift the left knee the distance of the step; raise the left hand to the reach and at the same time lift the right knee the distance of the step. Repeat.

In descending, pass the leading hand down to the rest, and at the same time slip the leading knees down the distance of the step. Repeat.

BOTH HANDS AT ONCE.

Second Series.
Exercise 9.
COURSE IV.

Position as in first exercise.

1. As in fifth exercise.

2. Raise both hands to the reach, grasp the pole strongly and spring upward with both knees the distance of the step. Repeat.

In descending, slip both hands down to the rest, grasp the pole strongly and slip both knees down the distance of the step. Repeat.

* * *

THE SLANTING POLE.

The first series of exercises on this machine, *under the pole*, are substantially the same as the corresponding series on the vertical pole, with this difference, that their difficulty is much reduced by its inclined position. The hands still follow the same modes of action as on the vertical machine, but with less difficulty, and the lower limbs bear altogether a less important part in the step, and consequently receive less benefit from it. This machine may for these reasons be made introductory to the vertical one, when, as will sometimes be the case, the simplest exercises on the latter are found too difficult for the beginner.

The second series, *above the pole*, is also essentially initiatory, but is valuable both in an elementary and practical sense. The exercises comprised in it are safe and interesting, besides giving much light and well distributed movement to both trunk and limbs; as, the reach being made and the lower limbs drawn up, the elongation of the trunk is almost entirely effected by the action of the back and loins.

The exercises in the third series, *under the pole*, are xecuted entirely by the upper part of the body and upper limbs, thus corresponding with the second series on the vertical machine, but, as in the series corresponding with the first, they are of a much less arduous nature, owing to the inclined position of the machine.

It will be seen that the first and third series of exercises on this machine entirely correspond with the first and second series on the pole in its vertical position, while every exercise is lessened in difficulty by its inclination; and as this changed position presents another surface, a third and intermediate series is afforded of an entirely different character to either, in which the column of the body is supported on the pole itself. This machine, therefore, is in all respects a valuable companion to the vertical one, with all the corresponding exercises slightly reduced in difficulty for the special practice of less able beginners.

The position of the instructor should be under the pole, because all falls from this machine will be under it; except when the climber is learning the movements of the step in the second series, when the instructor should be in front of the pole behind the climber in order to direct his efforts.

The Slanting Pole should be 3 inches in diameter, and not less than 15 feet or more than 20 feet in length, and laid at an angle of about 45 degrees.

First Series...... *Under the pole.*
Second Series.....*Above the pole.*
Third Series ..... *Hands only.*

LEFT HAND LEADING.

First Series.
Exercise 1.
Course I.

Position of attention, under the pole.

1. Advance the left hand to the reach and grasp the pole, the right following; lift the left foot from the ground and place it against the right side of the pole underneath, the knee to the left; lift the right foot and place the heel over the pole, the ankles crossing, the outside edges of the feet together, the pole between them (Fig. 1), straighten the legs and elongate the trunk, the column of the body at the incline of

Fig. 1.

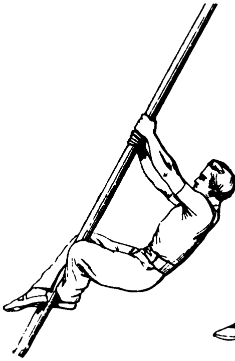


Fig. 2.

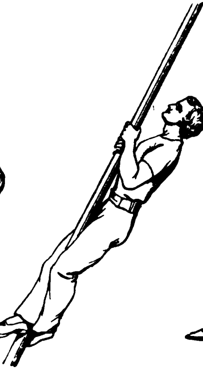
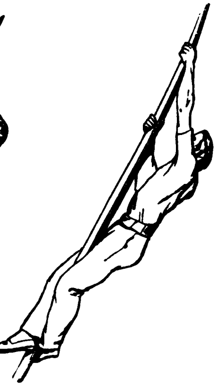


Fig. 3.



the pole, the head slightly held back, the eyes directed to the reach of the hands (Fig. 2).

2. Advance the left hand to the reach (Fig. 3), the right following, draw up the lower limbs without bending the arms, as in Fig. 1, straighten the legs and elongate the trunk to the rest of the hands. Repeat.

In descending, slip the right hand down to the rest, the left following, and lower the body to the reach of the hands. Repeat.

This exercise to be repeated with the right hand leading.

HAND OVER HAND.

First Series.
Exercise 2.
COURSE I.

Position as in first exercise.

1. As in first exercise.

2. Advance the left hand to the reach, as in Fig. 3, draw up the lower limbs, without bending the arm, straighten the knees and elongate the trunk to the rest of the right hand. Repeat, raising the right hand to the reach; the right and left hand alternating throughout.

In descending, slip the leading hand down to the rest, lower the body to the reach of the supporting hand. Repeat.

BOTH HANDS AT ONCE.

First Series.
Exercise 3.
COURSE II.

Position as in first exercise.

1. Advance both hands to the reach and grasp the pole; lift both feet from the ground and clasp the pole in the position

of first exercise. The rest of the body in the position of first exercise (Fig. 2).

2. Shoot up both hands to the reach, draw up the lower limbs without bending the arms, and elongate the trunk to the rest of the hands. Repeat.

In descending, slip both hands down to the rest, lower the body to the reach of the hands. Repeat.

WITH ONE HAND.

First Series.
Exercise 4.
COURSE III.

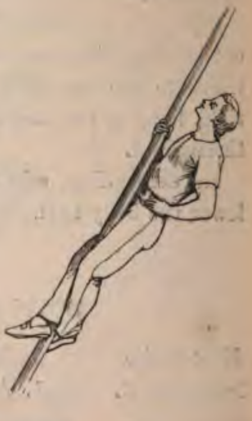
Position as in first exercise.

1. Advance the right hand to the reach and grasp the pole, spring from the ground and clasp the pole with the feet as in first exercise, bringing the right hand to the half reach, and placing the left hand on the hip joint, the fingers to the front, the thumb to the rear, the rest of the body in the position of first exercise (Fig. 4).

2. Tighten the clasp of the feet, raise the right hand to the reach, draw up the lower limbs, straighten the knees and elongate the trunk. Repeat.

In descending, slip the right hand down to the rest, lower the body to the half reach of the hand. Repeat.

Fig. 4.



This exercise to be repeated with the left hand.

LEFT HAND LEADING.

Second Series.
Exercise 5.
COURSE I.

Position of attention, facing the pole, the toes touching it.

1. Stoop forward and grasp the pole with the left hand, the right following immediately under it, slowly extend the trunk of the body along its surface; lift the left foot from the ground and place it against the right side of the pole, the knee on the left; lift the right foot from the ground and place it under the pole, clasping it with the back of the ankle, the trunk of the body in a straight line along its surface, the head slightly held back, the eyes directed to the reach of the hands (Fig. 5), straighten the legs and elongate the trunk (Fig. 6).

2. Advance the left hand to the reach (Fig. 7), the right following, draw up the lower limbs without bending the

Fig. 5.

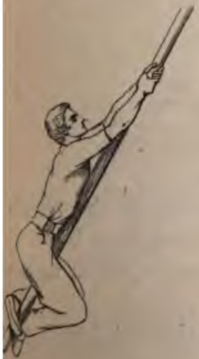


Fig. 6.

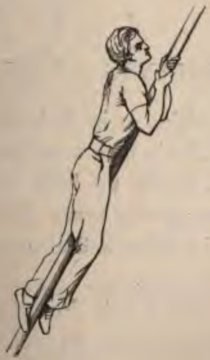
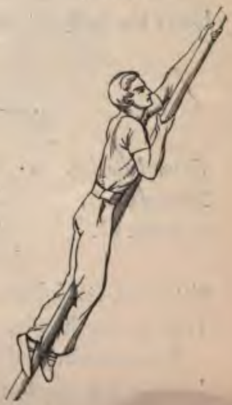


Fig. 7.



arms, straighten the knees and elongate the trunk to the rest of the hands. Repeat.

In descending, slip the right hand down to the rest, the left following, lower the body to the reach of the hands. Repeat.

This exercise to be repeated with the right hand leading.

HAND OVER HAND.

Second Series. Position as in fifth exercise.

Exercise 6. 1. As in fifth exercise.

COURSE I. 2. Advance the left hand to the reach, as in Fig. 7, draw up the lower limbs, without bending the arm, straighten the knees and elongate the trunk to the rest of the right hand. Repeat, raising the right hand to the reach, the right and left hand alternating throughout.

In descending, slip the leading hand down to the rest, lower the body to the reach of the supporting hand. Repeat.

BOTH HANDS AT ONCE.

Second Series. Position as in fifth exercise.

Exercise 7. 1. As in fifth exercise.

COURSE II. 2. Shoot up both hands to the reach, draw up the lower limbs without bending the arms, straighten the knees and elongate the trunk to the rest of the hands. Repeat.

In descending, slip both hands down to the rest, lower the body to the reach of the hands. Repeat.

LEFT HAND LEADING.

Third Series.
Exercise 8.
COURSE III.

Position of attention, under the pole.

1. Advance the left hand and grasp the pole, the right following; lift both feet from the ground, bringing the hands to the half reach, the legs together and straight, the feet together with the toes pointed downwards, the chest advanced, the shoulders square to the front, the neck free, the head slightly held back, the eyes directed to the front, the chin elevated (Fig. 8).

2. Advance the left hand to the reach (Fig. 9), the right following, bend the arms until the hands are at the half reach. Repeat.

Fig. 8.

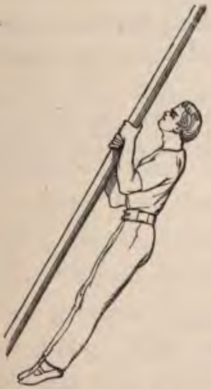
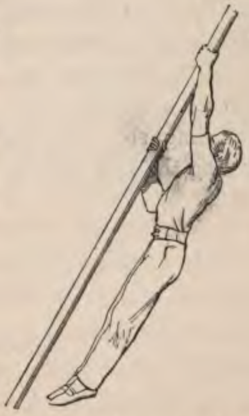


Fig. 9.



In descending, slip the right hand down to the rest, the left following. Repeat.

This exercise to be repeated with the right hand leading.

HAND OVER HAND.

Third Series.
Exercise 9.
COURSE III.

Position as in eighth exercise.

1. As in eighth exercise.

2. Advance the left hand to the reach, as in Fig. 9, leaving the right at the half reach; bend the left arm until the hand is at the half reach and raise the right hand to the reach. Repeat.

In descending, slip the leading hand down to the rest, leaving the supporting hand at the reach. Repeat.

BOTH HANDS AT ONCE.

Third Series.
Exercise 10.
COURSE III.

Position as in eighth exercise.

1. As in eighth exercise.

2. Shoot up both hands the distance of the step, but retaining the arms bent at the half reach. Repeat.

In descending, slip both hands down the distance of the step, retaining the arms bent as in the ascent. Repeat.

* * *

THE TURNING POLE.

ALL the exercises on this machine are of an essentially elementary character, and especially designed to accomplish two objects; first, to strengthen the hands. wrists, and fore-arms; second, to cultivate the power of preserving the equilibrium under the greatest difficulties.

No exercise on this machine requires much muscular power, nicety of movement for the preservation of balance being the chief requisite, although all the exercises forming the third series on the preceding machine can be executed here with the same advantages, heightened by the difficulty arising from the tendency of the pole to revolve. It is for this reason that these two machines are found very valuable in the gymnasium, as nothing is so desirable for learners as a wide and varied range of exercises interesting in themselves, and which cultivate dexterity of action, precision and accuracy of movement, and complete command of the trunk and limbs. They are valuable to the more advanced learners, because it is found that those exercises which are almost limited to great muscular effort, or in other words, in which the resistance is at its maximum and the movement at its minimum, are not so conducive to muscular development as where these qualities are fairly balanced.

The position of the instructor should be under the pole, except when directing the climber in the movements of the step, when he should be in front of it.

The Turning Pole should be similar to the preceding machine and laid at the same angle, but made to turn by means of an iron pin at each end, revolving in sockets placed in the floor and upper point of attachment.

FIRST SERIES. . . . . *The pole held firm.*
SECOND SERIES. . . . *The pole turning.*

RIGHT HAND LEADING.

First Series. Position of attention, facing the pole, the
Exercise 1. toes touching it.
COURSE I. 1. Stoop forward and grasp the pole with the right hand, the left following immediately underneath it, slowly extend the trunk of the body along its surface; lift the right foot from the ground and place it against the left side of the pole, the knee on the right; lift the left foot from the ground and place it under the pole, clasping it with the back of the ankle, the trunk of the body in a straight line along its surface, the head slightly nt back, the eyes directed to the reach of the hands, ighten the knees and elongate the trunk.

2. Advance the right hand to the reach, the left following, draw up the lower limbs, tightening the clasp of the hands, straighten the knees and elongate the trunk to the rest of the hands. Repeat.

In descending, slip the left hand down to the rest, the right following, lower the body to the reach of the hands. Repeat.

The positions in this exercise are the same as shown in Figs. 5, 6, and 7 on the Slanting Pole.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

First Series.
Exercise 2.
COURSE II.

Position as in first exercise.

1. As in first exercise.

2. Advance the left hand to the reach, draw up the lower limbs, tightening the clasp of the hands, straighten the knees and elongate the trunk to the rest of the right hand. Repeat, raising the right hand to the reach; the right and left hand alternating throughout.

In descending, slip the leading hand down to the rest, lower the body to the reach of the supporting hand. Repeat.

BOTH HANDS AT ONCE.

First Series.
Exercise 3.
COURSE II.

Position as in first exercise.

1. As in first exercise.

2. Shoot up both hands to the reach,

draw up the lower limbs, tightening the clasp of the hands, straighten the knees and elongate the trunk to the rest of the hands. Repeat.

In descending, slip both hands down to the rest, lower the body to the reach of the hands. Repeat.

RIGHT HAND LEADING.

Second Series.
Exercise 4.
COURSE III.

Position as in first exercise.

1. As in first exercise.
2. Advance the right hand to the reach, the left following, draw up the lower limbs, and elongate the trunk to the half reach of the hands, and during the last movement give the pole one quarter turn from right to left. Repeat.

In descending, slip the left hand down to the rest, the right following, lower the body to the half reach of the hands, and during the last movement give the pole one quarter turn, as on the ascent. Repeat.

This exercise to be repeated with the left hand leading, and turning the pole from left to right.

HAND OVER HAND.

Second Series.
Exercise 5.
COURSE III.

Position as in first exercise.

1. As in first exercise.
2. Advance the left hand to the reach, draw up the lower limbs, elongate the trunk to the half reach of the right hand, and during the last

movement give the pole one quarter turn from right to left. Repeat.

In descending, slip the leading hand down to the rest, and while lowering the body to the half reach of the supporting hand give the pole one quarter turn, as on the ascent. This to be repeated with the other hand, so that the pole will be kept continuously turning during the descent.

BOTH HANDS AT ONCE.

Second Series. Position as in first exercise.

Exercise 6. 1. As in first exercise.

COURSE III. 2. Shoot up both hands to the reach, draw up the lower limbs, and elongate the trunk to the half reach of the hands, and during the last movement give the pole one half turn from right to left.

In descending, slip both hands down to the rest, lower the body to the half reach of the hands, and during the last movement give the pole one half turn from right to left, as on the ascent.

This exercise to be repeated turning the pole from left to right.

TURNING WITH THE POLE.

Second Series. Position as in first exercise.

Exercise 7. 1. As in first exercise.

COURSE IV. 2. Shoot up both hands to the reach, draw up the lower limbs (Fig. 1), and elongate the trunk, and during the last movement set the trunk of the body free from the pole, turn the pole from right to left, allowing the body to go with it (Fig. 2), modifying or increasing the momentum of the fall by extending or bending the arms, so that the pole shall make one complete turn, bringing the climber again to the surface. Resume the climb, making one turn at each step.

Fig. 1.

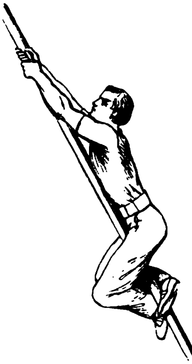
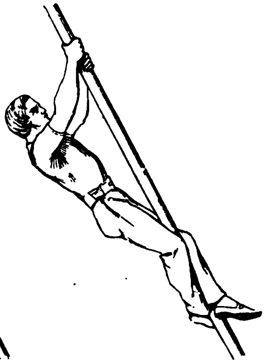


Fig. 2.



In descending, slip both hands down to the rest, lower the body to the half reach of the hands, and during this movement make one turn, as in the ascent. Repeat.

This exercise to be repeated, making the turn from left to right.

* * *

THE PAIR OF VERTICAL POLES.

The range of exercises on this machine is not wide, but every one is of a high class; they are all arduous, and are approached through those of the single pole. The learner should never be allowed to attempt them until he is master of the second series on the single pole.

When well executed they are very elegant, and show at a glance the power at the command of the climber, the body being sustained in perfect position between the poles by the hand-grasp alone. For these reasons this machine is always a favourite with able climbers.

The instructor must be careful to give the 'halt' whenever there is any kick or struggle of the lower limbs or trunk, or whenever the full step is not made by the hands, or the elevation of the trunk after the reach is not completed, indicating local or general fatigue, and therefore insecurity of grasp. This applies most especially to the two last exercises, where the feet are removed from the vertical line.

In the fifth exercise the climber must be instructed to be careful to keep the feet between the poles and to guard against their passing to the rear with the poles clashing in front; in this exercise the knees should be kept well bent, the lifting of the lower limbs should be at the instant of the elevation of the hand, and the alternate action of the right and left sides should be rhythmical, both in the ascent and descent. Another point requiring attention in this exercise is, when the climber nears the top (supposing he is sufficiently advanced to climb the length of the poles), that the 'halt' shall always be given and the climber not allowed to look upwards to ascertain his position; it would be in this act that a loss of equilibrium would most readily occur.

The instructor's place should be right or left of the poles, according as the climber shows a tendency to lose his equilibrium to front or rear, in order that he may be able to interpose his right hand in such a case. In the early practice of the third and last exercises, two instructors, or an instructor and a monitor, should be placed right and left of the machine, on occasions when it is thought desirable to let the climber do his uttermost; but, as above directed, for general practice the 'halt' should be given at the slightest indication of fatigue or failing power, and while he has yet strength to accomplish the descent.

The Pair of Vertical Poles should be 1½ inch in diameter and 18 inches apart, and not less than 12 feet or more than 18 feet high.

FIRST SERIES . . . . *Upright.*
SECOND SERIES. . . . . . . *Hands reversed.*
THIRD SERIES. . . . . *Sitting.*

RIGHT HAND LEADING.

First Series.
Exercise 1.
COURSE II.

Position of attention, between the poles.

1. Raise the right hand to the reach and grasp the right pole, the left following on the left pole; lift both feet from the ground, bringing the hands to the half reach, the shoulders flat, the chest advanced, the trunk of the body upright and held firm, the neck free, the chin elevated, the eyes directed to the front, the legs straight and together, the feet together, the toes pointed to the ground, the whole column of the body sustained in the line of the poles (Fig. 1).

Fig. 1.

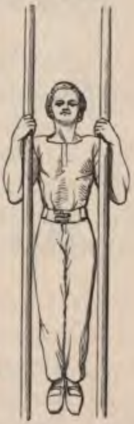
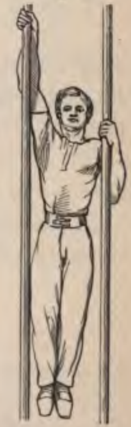


Fig. 2.



2. Raise the right hand to the reach (Fig. 2), the left following; elevate the body to the half reach of the hands. Repeat.

In descending, slip the right hand down to the rest, the left following; lower the body to the half reach of the hands. Repeat.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

First Series.
Exercise 2.
COURSE III.

Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach and elevate the body to the rest of the left hand; raise the left hand to the reach and elevate the body to the rest of the right hand. Repeat.

In descending, slip the leading hand down to the rest and lower the body to the reach of the supporting hand. Repeat.

BOTH HANDS AT ONCE.

First Series.
Exercise 3.
COURSE III.

Position as in first exercise.

1. As in first exercise, raising both hands at the same time.

2. Shoot up both hands to the reach and elevate the body to the rest of the hands. Repeat.

In descending, lower the body until the hands are at the reach; slip both hands down to the rest. Repeat.

RIGHT HAND LEADING.

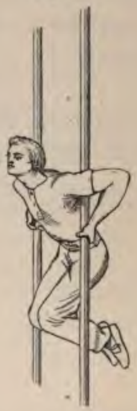
Second Series.
Exercise 4.
COURSE IV.

Position as in first exercise.

1. Stoop forward from the waist, bringing the head and shoulders in front of the poles, bend the arms and draw up the
s to the rear until they are nearly as high as the

armpits, and grasp the poles, the palms behind the poles, the thumbs to the front; lift both feet from the ground, bending the legs, the feet to the rear, the toes pointed to the rear (Fig. 3).

Fig. 3.



2. Slip the right hand up and grasp the pole, aiding it by the elevation of the right side and right leg, the left hand following, with the corresponding side and leg. Repeat.

In descending, slip the right hand down and grasp the pole, and at the same time lower the right side and right leg, the left hand following with the corresponding side and leg. Repeat.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

Second Series.
Exercise 5.
COURSE IV.

Position as in first exercise.

1. As in fourth exercise.

2. Slip the right hand up and grasp the pole, as in fourth exercise; slip the left hand up the distance of the step beyond the right. Repeat.

In descending, slip the right hand down and grasp the pole, as in fourth exercise; slip the left hand down the distance of the step beyond the right. Repeat.

BOTH HANDS AT ONCE.

Second Series.
Exercise 6.
Course IV.

Position as in first exercise.

1. As in fourth exercise.

2. Slip both hands up the distance of the step, and grasp the pole, retaining the arms bent. Repeat.

In descending, slip both hands down the distance of the step, retaining the arms bent. Repeat.

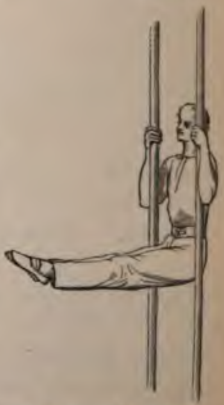
RIGHT HAND LEADING.

Third Series.
Exercise 7.
Course IV.

Position as in first exercise.

1. Raise both hands and grasp the poles at the half reach; lift both feet from the ground and extend the lower limbs horizontally at a right angle to the trunk, the legs straight and together, the feet together, the toes pointed to the front, the trunk of the body upright, the neck free, the head slightly held back, the eyes directed to the reach of the hands (Fig. 4).

Fig. 4.



2. Raise the right hand to the reach and grasp the pole, the left following on the left; elevate the body to the half reach of the hands. Repeat.

In descending, slip the right hand down and grasp the pole, the left owing, and lower the body to half reach of the hands. Re-t.

his exercise to be repeated with the left hand leading.

HAND OVER HAND.

Third Series.
Exercise 8.
COURSE IV.

Position as in first exercise.

1. As in seventh exercise.

2. Raise the right hand to the reach and grasp the pole; raise the left hand to the reach and grasp the pole beyond the right, retaining the trunk and lower limbs in position. Repeat.

In descending, slip the right hand down and grasp the pole; slip the left hand down and grasp the pole below the right, retaining the trunk and lower limbs in position. Repeat.

BOTH HANDS AT ONCE.

Third Series.
Exercise 9.
COURSE IV.

Position as in first exercise.

1. As in seventh exercise.

2. Raise both hands to the reach and grasp the poles right and left, at the same time raising the trunk and lower limbs in position. Repeat.

In descending, slip both hands down to the rest and grasp the poles right and left, retaining the body and lower limbs in position. Repeat.

THE PAIR OF SLANTING POLES.

The exercises on this machine bear a great resemblance in character to the second series on the single slanting pole, and all are of an initiatory character. They are excellent for beginners, as giving much movement in a good position, and they yield also good practice for more advanced climbers, when the object is the attainment of speed in the step in both the ascent and descent. A chief point to be observed in them is, that the equipoise of the body shall be sustained by the 'rest' of the limbs, upper and lower; and they are consequently very valuable for the strengthening of these parts.

With beginners the instructor will require to be strict as to position and action, as on the accuracy of these depend the ease and safety of the ascent; these correctly acquired, and the poles fixed securely, there is little or no danger from falls, and none from any other source. Every opportunity should be seized of cultivating these exercises, for the reasons stated above, and also for the reasons advanced for the practice of those on the single slanting and turning poles.

The position of the instructor should be on the left of the machine, facing it.

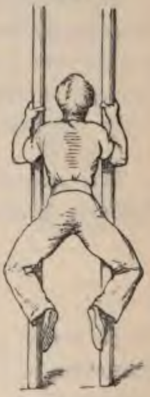
The Pair of Slanting Poles should be similar to the single pole and laid at the same angle; they should be 14 inches apart.

SINGLE SERIES.

RIGHT HAND LEADING.

Single Series.
Exercise 1.
COURSE I.

Fig. 1.



Position of attention, facing the poles, close to them.

1. Lean forward, and with the right hand at the half reach grasp the right pole, the left hand following on the left pole; lift the right foot from the ground and place the instep against the inside of the right pole, the knee on the outside, the lower part of the leg crossing the pole diagonally, the left following on the left pole; extend and sustain the trunk between and in the line of the poles, the head held back and the eyes directed to the reach of the hands (Fig. 1).

2. Raise the right hand to the reach, the left following on the left pole, draw up the lower limbs and elongate the trunk to the rest of the hands. Repeat.

In descending, slip the left hand down to the rest, the right following on the right pole, lower the body to the reach of the hands. Repeat.

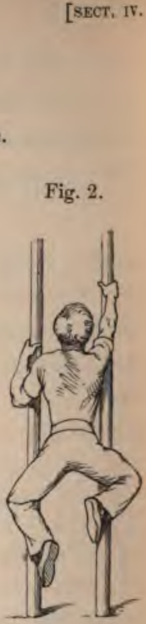
This exercise to be repeated with the left hand leading.

RIGHT SIDE LEADING.

Single Series. Position as in first exercise.
Exercise 2. 1. As in first exercise.
COURSE I. 2. Raise the right hand to the reach, and at the same time draw up the right foot (Fig. 2), elongate the trunk, and at the same time raise the left hand and left foot opposite the right hand and right foot. Repeat.

In descending, pass the leading hand down to the rest, extending the corresponding leg, the supporting hand and foot following, at the same time lowering the body. Repeat.

Fig. 2.



This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

Single Series. Position as in first exercise.
Exercise 3. 1. As in first exercise.
COURSE II. 2. Raise the right hand to the reach, and at the same time draw up the right foot as in preceding exercise, elongate the trunk and raise the left hand and left foot the distance of the step beyond the right hand and right foot. Repeat.

In descending, pass the leading hand to the rest, extending the corresponding leg; lower the body and at the same time pass the supporting hand the distance of the step below the *leading* hand, and extend the corresponding leg. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

Single Series.
Exercise 4.
COURSE II.

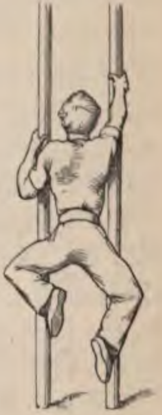
Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach, and at the same time draw up the left foot (Fig. 3), elongate the trunk and at the same time raise the left hand the distance of the step above the right, and the right foot the same distance above the left. Repeat.

In descending, pass the leading hand down to the rest, extending the opposite leg, lower the body and at the same time pass the supporting hand down below the leading hand and extend the opposite leg. Repeat.

Fig. 3.



BOTH HANDS AT ONCE.

Single Series.
Exercise 5.
COURSE III.

Position as in first exercise.

1. As in first exercise.

2. Shoot up both hands to the reach, draw up the lower limbs, and elongate the trunk to the rest of the hands. Repeat.

In descending, slip both hands down to the rest, and lower the body to the reach of the hands. Repeat.

All the foregoing exercises to be repeated with the feet on the outside of the poles, the knees inside.

RIGHT SIDE LEADING.

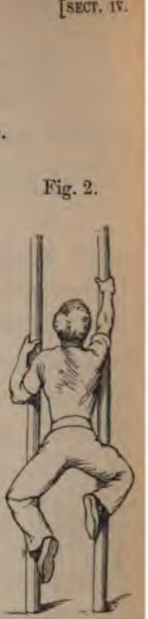
Single Series.
Exercise 2.
COURSE I.

Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach, and at the same time draw up the right foot (Fig. 2), elongate the trunk, and at the same time raise the left hand and left foot opposite the right hand and right foot. Repeat.

Fig. 2.



In descending, pass the leading hand down to the rest, extending the corresponding leg, the supporting hand and foot following, at the same time lowering the body. Repeat.

This exercise to be repeated with the left side leading.

RIGHT AND LEFT SIDE.

Single Series.
Exercise 3.
COURSE II.

Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach, and at the same time draw up the right foot as in preceding exercise, elongate the trunk and raise the left hand and left foot the distance of the step beyond e right hand and right foot. Repeat.

In descending, pass the leading hand to the rest, extending corresponding leg; lower the body and at the same time the supporting hand the distance of the step below the ing hand, and extend the corresponding leg. Repeat.

RIGHT AND LEFT, HAND AND FOOT.

Single Series.
Exercise 4.
COURSE II.

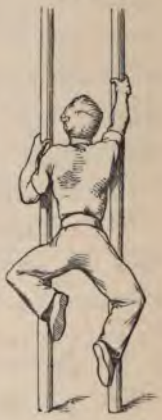
Position as in first exercise.

1. As in first exercise.

2. Raise the right hand to the reach, and at the same time draw up the left foot (Fig. 3), elongate the trunk and at the same time raise the left hand the distance of the step above the right, and the right foot the same distance above the left. Repeat.

In descending, pass the leading hand down to the rest, extending the opposite leg, lower the body and at the same time pass the supporting hand down below the leading hand and extend the opposite leg. Repeat.

Fig. 3.



BOTH HANDS AT ONCE.

Single Series.
Exercise 5.
COURSE III.

Position as in first exercise.

1. As in first exercise.

2. Shoot up both hands to the reach, draw up the lower limbs, and elongate the trunk to the rest of the hands. Repeat.

In descending, slip both hands down to the rest, and lower the body to the reach of the hands. Repeat.

All the foregoing exercises to be repeated with the feet on the outside of the poles, the knees inside.

attention of the climber, besides giving an appearance of timidity to his efforts.

In the event of a slip the effort must be, not as with the pole, to slip downwards, for the rope passing through the hands of a falling man would cut it to the bone, but to re-grasp the rope. In all the exercises of the second series care must be taken that the climber has no articles of clothing hanging loose or standing prominent about the breast or waist, especially in the descent; as, after the sense of touch has been deadened by the climb, the hand may grasp these instead of the rope in passing to the rest.

It is also most desirable to accustom the climber to halt more than once during the ascent, and to change from one exercise to another on each recommencement of it. This is useful, not only for elementary, but for practical purposes, as it enables the climber to continue his ascent far beyond the distance attainable by a single mode of climbing, and also relieves, by a change of action and position, the parts engaged.

The position of the instructor should be the same as with the vertical pole.

The Vertical Rope may be of any length from 20 feet to 50 feet; there should be at least three sizes in a gymnasium, of the respective diameter of 1 inch, inch, 2 inches.

FIRST SERIES ...... *With hands and feet.*
SECOND SERIES ..... *With hands only.*
THIRD SERIES ...... *Sitting.*

RIGHT HAND LEADING.

(THE FOOT IN THE HALF TURN.)

First Series.
Exercise 1.
COURSE I.

Position of attention, facing the rope.

1. Raise the right hand to the reach and grasp the rope, the left following (Fig. 1); lift the right foot from the ground and place it against the left side of the rope, the knee on the right side (Fig. 2); lift the left foot and place it in front of

Fig. 1.

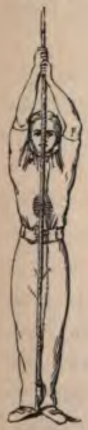


Fig. 2.

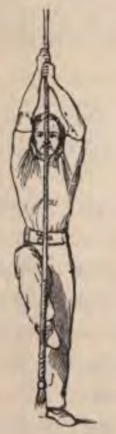


Fig. 3.

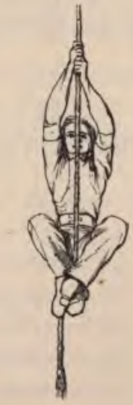
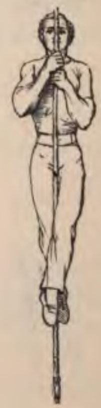


Fig. 4.



the rope, the ankles crossing, the outside edges of the feet together, the rope between them (Fig. 3); straighten the legs, elongate the trunk; the whole column of the body upright, the chest advanced, the shoulders flat, the elbows in by the sides, the hands at the half reach, the neck free, the head slightly bent back, the chin elevated, the eyes directed to the reach of the hands (Fig. 4).

2. Raise the right hand to the reach and grasp the rope, the left following; draw up the lower limbs, slightly relaxing but without relinquishing the clasp of the feet and without bending the arms, as in Fig. 3; tighten the clasp of the feet when elevated, straighten the knees and elongate the trunk to the rest of the hands, as in Fig. 4. Repeat.

In descending, slip the left hand down to the rest, and grasp the rope, the right following; lower the body to the reach of the hands, retaining the legs straight and the rope between the feet. Repeat.

This exercise to be repeated with the left hand leading, the left foot under the rope, the right above it.

RIGHT HAND LEADING.

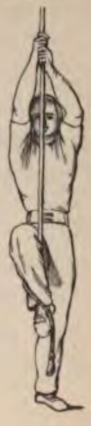
(THE FOOT IN THE FULL TURN.)

First Series.
Exercise 2.
COURSE I.

Position as in first exercise.

1. Raise the right foot from the ground, and by a circular movement of the leg over the rope from the outside inwards, pass it round the leg so as to encompass it by a full turn, commencing on the inner side of the thigh and terminating

Fig. 5.



on the inner side of the foot (Fig. 5), the left foot as in first exercise. The rest of the body as in first exercise.

2. Raise the right hand to the reach and grasp the rope, the left following; slacken the clasp of the feet, draw up the lower limbs without bending the arms, tighten the clasp of the feet, straighten the legs, and elongate the trunk to the rest of the hands. Repeat.

Descend as in first exercise.

This exercise to be repeated with the left hand leading, the left foot making the full turn.

RIGHT HAND LEADING.

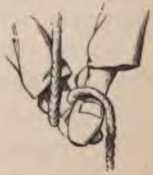
(THE FOOT IN THE STIRRUP LOOP.)

First Series.
Exercise 3.
COURSE I.

Position as in first exercise.

1. Lift the right foot from the ground and place it against the rope, as in first exercise. Lift the left foot from the ground and place it on the right side of the rope, and bringing it up from under the right with the end of the rope over the instep, rest the front part of the sole on the front part of the instep of the right (Fig. 6); the rope thus being folded round the right foot, passing under its hollow, and tightly held in its place by the left, over

Fig. 6.



which it falls; straighten the legs and elongate the trunk to the half reach of the hands; the rest of the body as in first exercise.

2. Raise the right hand to the reach and grasp the rope, the left following; slacken the clasp of the feet, draw up the lower limbs without bending the arms, replace the left foot on the right, lifting the rope with it as before, straighten the knees and elongate the trunk to the rest of the hands. Repeat. At the last step, relinquish the loop and place the left foot over the right as in first exercise.

Descend as in first exercise.

This exercise to be repeated with the left hand leading and the left foot in the stirrup loop.

HAND OVER HAND.

First Series.
Exercise 4.
COURSE II.

Position as in first exercise.

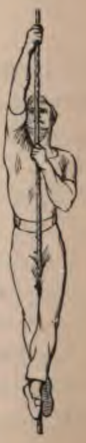
1. As in first exercise.

2. Raise the right hand to the reach and grasp the rope (Fig. 7), draw up the lower limbs without bending the right arm, straighten the legs, and elongate the trunk to the rest of the right hand. Repeat, raising the left hand to the reach; the right and left hand alternating throughout.

In descending, slip the leading hand down to the rest and grasp the rope, lower the body to the reach of the supporting hand, the rest of the body as in first exercise. Repeat.

This exercise to be repeated with the feet *in the* positions of second and third exercises.

Fig. 7.



HAND OVER HAND.

(A SECOND METHOD.)

First Series.
Exercise 5.
COURSE II.

Position as in first exercise.

1. As in first exercise.

2. Raise the left hand to the half reach above the right, and raise the right to the reach above the left, draw up the lower limbs, straighten the legs, and elongate the trunk. Repeat.

Descend as in fourth exercise.

BOTH HANDS AT ONCE.

First Series.
Exercise 6.
COURSE II.

Position as in first exercise.

1. Raise both hands to the reach and grasp the rope; lift both feet from the ground and clasp the rope in the position of first exercise, bringing the hands to the half reach, as in Fig. 4, the rest of the body as in first exercise.

2. Shoot up both hands to the reach, draw up the lower limbs without bending the arms, straighten the legs and elongate the trunk. Repeat.

In descending, slip both hands down to the rest and grasp the rope, lower the body to the reach of the hands. Repeat.

WITH ONE HAND.

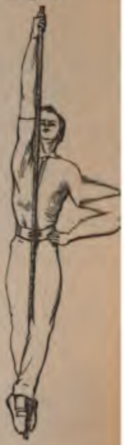
First Series.
Exercise 7.
COURSE IV.

Position as in first exercise.

1. Raise the right hand to the reach and grasp the rope; spring from the ground

and clasp the rope with the feet as in first exercise, bringi the right hand to the half reach; place the left hand on the hip joint, the fingers to the front, the thumb to the rear, the rest of the body in the position of first exercise (Fig. 8).

Fig. 8.



2. Tighten the clasp of the feet, raise the right hand to the reach, draw up the lower limbs without bending the arm, straighten the knees and elongate the trunk. Repeat.

In descending, slip the right hand down to the rest, lower the body to the half reach of the hand. Repeat.

This exercise to be repeated with the left hand.

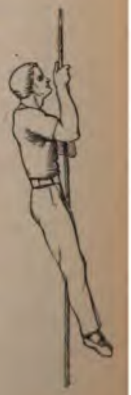
RIGHT HAND LEADING.

Second Series.
Exercise 8.
COURSE III.

Position as in first exercise.

1. Raise the right hand to the reach and grasp the rope, the left following; lift both feet from the ground and pass them to the right side of the rope, the hands at the half reach, the legs together and straight, and slanting to the front, the toes pointed in the same direction, the trunk of the body held firm and upright, the chest advanced, the shoulders flat, the elbows in by the sides, the head slightly bent back, the eyes directed to the reach of the hands (Fig. 9).

Fig. 9.



2. Raise the right hand to the reach and grasp the rope, the left following; elevate the body to the half reach of the hands. Repeat. At the last step, clasp the rope with the feet, as in first exercise.

Descend as in first exercise.

This exercise to be repeated with the lower limbs on the left side of the rope.

These exercises to be repeated with the left hand leading.

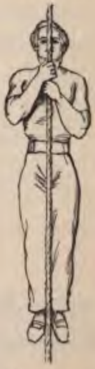
HAND OVER HAND.

Second Series.
Exercise 9.
COURSE III.

Position as in first exercise.

1. Raise the right hand to the reach and grasp the rope, the left following; lift both feet from the ground, raising the body until the hands are at the half reach, the legs straight and together, the toes pointed downwards and slightly turned out (the rope lying between them), the column of the body perfectly upright and in the line of the rope, the head erect, the eyes directed to the reach of the hands (Fig. 10).

Fig. 10.



2. Raise the right hand to the reach, elevating the body to the rest of the left; raise the left hand to the reach, elevating the body to the rest of the right. Repeat. At the last step clasp the rope with the feet, as in fourth exercise.

Descend as in fourth exercise.

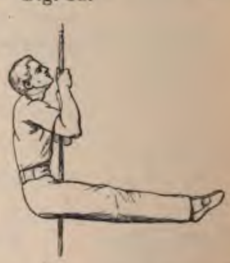
RIGHT HAND LEADING.

Third Series.
Exercise 10.
Course IV.

Position as in first exercise.

1. Raise the right hand to the reach and grasp the rope, the left following; bend the arms and lift both feet from the ground and extend the lower limbs horizontally on the right side of the rope, the legs straight and together, the feet together, the toes pointed to the front, the trunk of the body upright, the neck free, the head slightly bent back, the eyes directed to the reach of the hands (Fig. 11).

Fig. 11.



2. Raise the right hand to the reach and grasp the rope, the left following; elevate the body to the half reach of the hands. Repeat. At the last step, clasp the rope with the feet, as in first exercise.

Descend as in first or fourth exercises.

This exercise to be repeated with the left hand leading.

HAND OVER HAND.

Third Series.
Exercise 11.
Course IV.

Position as in first exercise.

1. As in tenth exercise.

2. Raise the right hand to the reach and grasp the rope; raise the left hand to the reach and grasp the rope beyond the right, retaining the body and lower limbs in position. Repeat.

Descend as in first or fourth exercises.

THE ROSARY.

The single exercise on this machine is a very valuable one for elementary practice, as it shows at a glance the perfect action of the step on all climbing apparatus; for it is on this only that the perfect rest for the foot, and the adequate fulcrum for the effort in straightening the knee and elongating the trunk, are obtained. When, therefore, it is desirable to show to a beginner the precise movements which go to make the step in climbing, and their sequence, he should be taken to the rosary and have there explained to him that these same consecutive movements compose the step on all climbing machines where both hands and feet are engaged; the firmness of the clasp of the lower limbs supplying the rest presented to the soles of the feet by the beads of the rosary.

As a purely elementary exercise it is valuable also on account of the employment which it gives to the muscles of the back.

In the initiatory instruction care must be taken that the climber preserves the position perfectly, for the tendency of the action of straightening the knees is to push the feet to the front, and with them the lower part of the rosary, thus throwing the weight of the body on the arms.

The position of the instructor should be immediately beneath and behind the climber, with the right hand disengaged, and the left steadying the machine.

The Rosary consists of a vertical rope, on which are strung, at intervals of from 12 to 18 inches, elm beads, turned to the shape of half a ball, 4 inches in diameter, the flat side being upwards. The rope should not be less than 15 feet or more than 20 feet high.

SINGLE SERIES.

THE SIMPLE CLIMB.

Single Series.
Single Exercise.
COURSE I.

Position of attention, facing the rosary.

1. Raise the right hand to the reach and grasp the rope, the left following; lift both feet from the ground and place them on the first bead (Fig. 1), the heels together, the toes pointed to the front, the rope as it were rising from the hollow between the feet and ascending in front of the ankle joint; straighten the knees and elevate the body to the half reach of the hands, the trunk upright, the chest advanced, the shoulders flat and square to the front, the head slightly

held back, the eyes directed to the reach of the hands (Fig. 2).

Fig. 1.

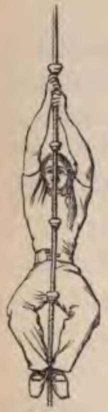


Fig. 2.

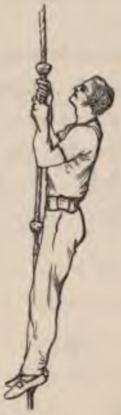
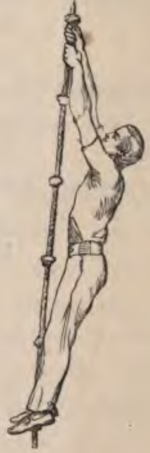


Fig. 3.



2. Raise the right hand to the reach, the left following (Fig. 3), lift both feet and place them on the second bead, straighten the knees and elongate the trunk. Repeat.

In descending, pass the left hand down to the rest, the right following; slightly separate the feet, and retaining the lower limbs perfectly straight and the rest of the body in position, lower the feet to the next bead. Repeat.

This exercise may be varied and the difficulty progressively increased by passing one, two, or more beads at each step, giving special care to the hand-grasp during the elongatory movement of the trunk.

TO REST ON THE ROSARY.

1st method. Press the chest and shoulders to the front, thereby bringing the weight almost entirely on the feet.

2nd method. Press the breast, cheek, and temple of one side against the rope, at the same instant relieving, by change of position, the corresponding hand.

3rd method. Pass both feet to the front, and sit on the nearest bead. The entire descent may be made in this manner.

* * *

THE MAST.

ALL the exercises on this machine are of an arduous kind, requiring strong and combined effort from the entire frame.

The power of climbing a perfectly smooth column or pillar may be greatly increased by practice; but such practice with the young or less robust must be conducted with much care and discretion, because during part of the combined movement comprising the step, the mast presses on the front and lower region of the chest, and therefore interferes with the freedom of respiration. For this reason short distances only should be attempted in the initiatory lessons.

The position of the instructor should be the same with this machine as with the vertical pole.

The Mast should be a Norway spar, not less than 10 inches or more than 12 inches in diameter at the base, and diminishing gradually towards the top; its length may be from 40 feet to 60 feet.

First Series. . . . . . *With hands and feet.*
Second Series. . . . *With hands only.*

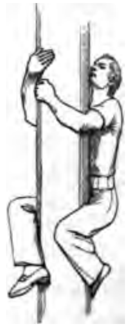
HAND OVER HAND.

First Series.
Exercise 1.
Course III.

Position of attention, facing the mast.

1. Raise the right hand to the reach, half encircling the mast on the right side, the palm of the hand open, the fingers extended but touching each other, the left hand following, half encircling the mast on the left side, under the right; lift the left foot from the ground and place it against the mast, the knee towards the left side, the foot towards the right side, the front of the leg crossing the mast diagonally, lift the right foot from the ground and pass it round the mast, the calf of the leg crossing it diagonally, the trunk of the body erect, the head well held back (Fig. 1).

Fig. 1.



2. Pass the left hand above the right to the reach, draw up the lower limbs and elongate the trunk; pass the right hand above the left and complete the movements of the step. Repeat.

In descending, pass the leading down below the supporting hand, lower the body the same distance. Repeat.

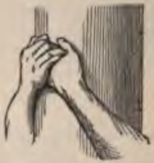
THE HANDS OVERLAPPED.

First Series.
Exercise 2.
COURSE III.

Position as in first exercise.

1. Raise the right hand to the reach as in first exercise, raise the left hand to the reach in a line with the right, and overlapping it, its fingers finding a grip on the ledge formed by the fingers and knuckles of the right (Fig. 2); lift the feet from the ground, and clasp the mast as in first exercise.

Fig. 2.



2. Raise the right hand to the reach, the left following and taking the overlap, draw up the lower limbs, and elongate the trunk. Repeat.

Descend as in first exercise.

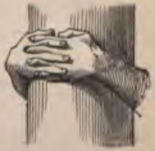
THE HANDS INTERLACED.

First Series.
Exercise 3.
COURSE III.

Position as in first exercise.

1. Raise both hands to the reach, encircling the mast, separate the fingers of each hand as they approach each other and closely interlace them, the points of the fingers closely pressing the back of the opposite hand (Fig. 3); lift the feet from the ground and clasp the mast as in first exercise.

Fig. 3.



2. Shoot up both hands to the reach without relaxing the intergrasp, draw up the lower limbs and elongate the trunk. Repeat.

In descending, slip both hands down to the rest, retaining the intergrasp, lower the body to the reach of the hand. Repeat.

TO WALK THE MAST.

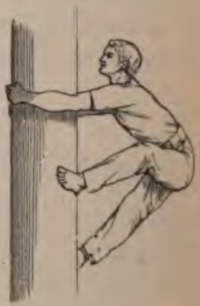
First Series.
Exercise 4.
COURSE IV.

Position as in first exercise.

1. Raise both hands to the reach and grasp the mast, right and left, with the open palms; lift the right foot and place it with the sole flat against the face of the mast, the left following; the upper and lower limbs straight, the back flat, the head held back, the eyes directed to the reach of the hands.

2. Raise the left hand, and at the same time lift the left foot the distance of the step (Fig. 4); incline to the left, raise the right hand, and at the same time lift the right foot the distance of the step beyond the left. Repeat.

Fig. 4.



In descending, slip the leading hand and leading foot down the distance of the step. Repeat.

This exercise to be repeated, right and left, hand and foot.

This is the most rapid mode of climbing the mast; it ould always be performed with the naked foot. It may be performed on the vertical pole, fixed at the foot uspended, on the slanting pole, and on the pair of ting poles.

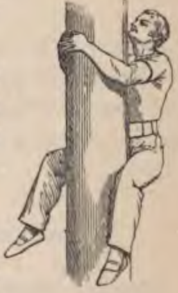
THE HANDS ONLY.

Second Series.
Exercise 5.
COURSE IV.

Position as in first exercise.

1. Raise both hands to the reach and encircle the mast as in third exercise, the hands interlaced; lift both feet from the ground, bending the arms to the half reach, the lower limbs pendent on each side of the mast, but not touching it, the knees slightly bent, the rest of the body as in first exercise (Fig. 5).

Fig. 5.



2. Shoot up both hands the distance of the reach, retaining the intergrasp, and by the same action elevate the body, leaving the arms bent, as at the half reach. Repeat.

In descending, slip both hands down to the rest, retaining the intergrasp, and at the same time lower the body, leaving the arms bent, as at the half reach. Repeat.

TO DESCEND THE MAST RAPIDLY.

Take the overlap or intergrasp, bring the head upright, and guide the rate of speed by the pressure of the upper and lower limbs, in a continuous descent.

TO REST ON THE MAST.

TO REST THE LOWER LIMBS.

First method. Reverse their position on the mast.

Second method. Take a secure grasp of the mast with the hands, and slowly detaching the lower limbs, stretch them down by the sides of the mast.

TO REST THE UPPER LIMBS.

Detach them, one at a time from the mast, and opening the fingers and palm and relaxing every muscle of the hand and arm, let it hang by the side, or hold it in a position the reverse of that which it occupied during the ascent.

TO REST THE TRUNK OF THE BODY.

Strongly clasp the mast with the lower limbs, slowly separate the grasp of the hands, so as to set the chest and abdomen free.

PART III.

◆

APPENDIX.

APPENDIX A.

LUSTRATIONS OF CERTAIN FORMS OF GROWTH AND DEVELOPMENT, REGULAR AND IRREGULAR, AT DIFFERENT AGES.

g. 1. Bust and Upper Limbs, showing perfectly regular and complete developments. Age 23.

2. Arm (larger scale), showing very powerful developments. Age 24.

3. Bust and Upper Limbs, showing regular and uniform developments. Age 18.

4. Bust and Upper Limbs, showing regular but imperfect developments. Age 18.

5. Bust and Upper Limbs, showing irregular growth; —'growing on one side.' Age 10.

6. Back and Upper Limbs, showing similar irregularity of growth. Age 13.

7. Back, showing spinal curvature.

8. Back, showing spinal curvature. Another form.

9. Bust, showing 'hollow chest.' Age 20.

10. Bust and Upper Limbs, showing 'drooping shoulders.' Age 20.

11. Bust, showing 'pigeon breast;' side view. Age 10.

12. Bust (of same individual), showing 'pigeon breast;' front view.

13. Bust, showing imperfectly developed chest. Age 21.

14. Bust (of same individual), showing nature and extent of expansion of chest after a year's practice of systematized exercise.

Fig. 1.

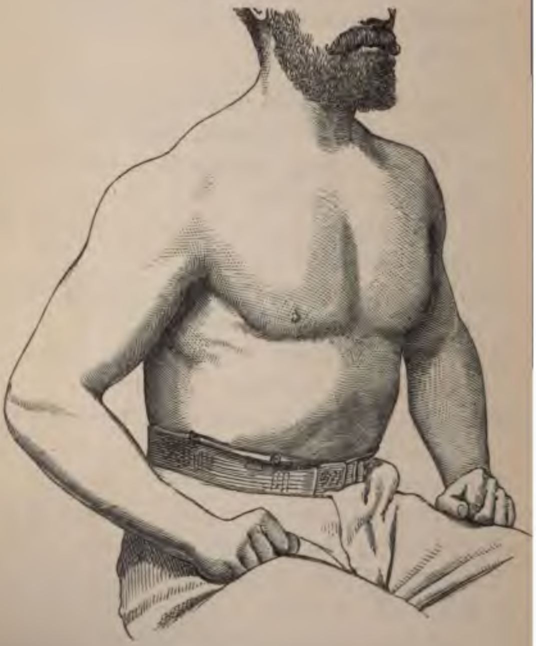


Fig. 2.

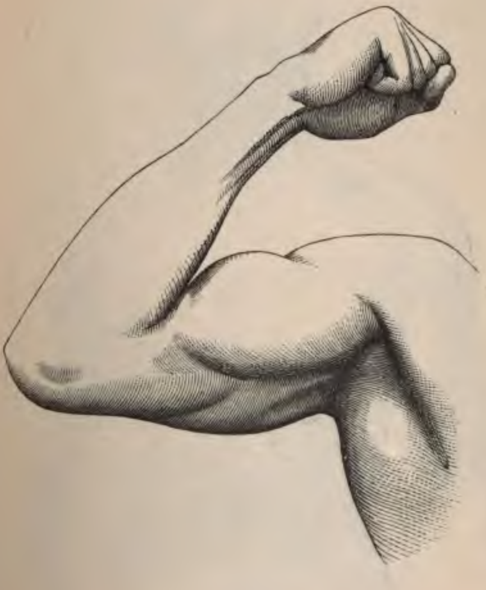


Fig. 3.

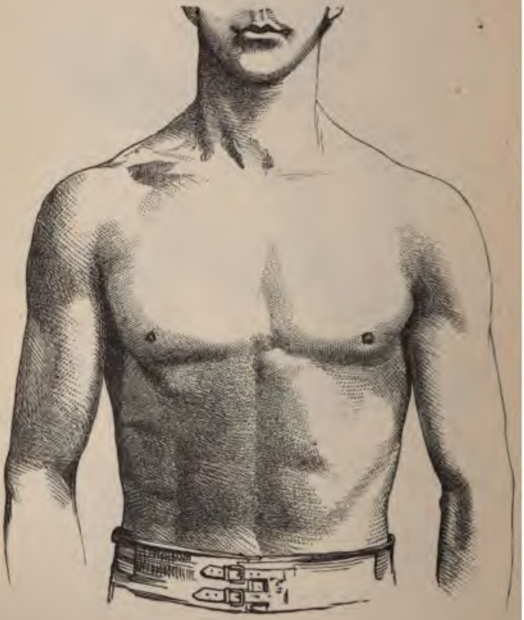


Fig. 4.

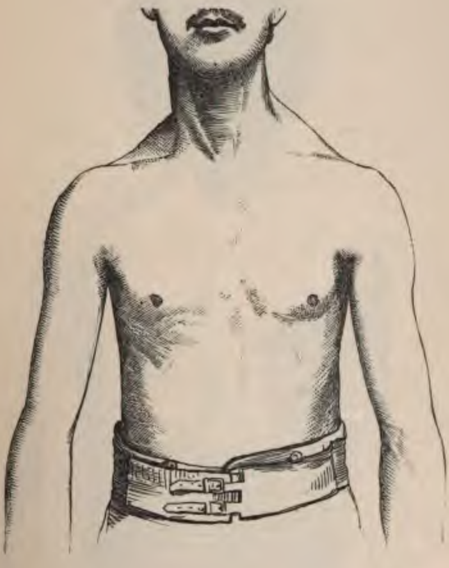


Fig. 5.

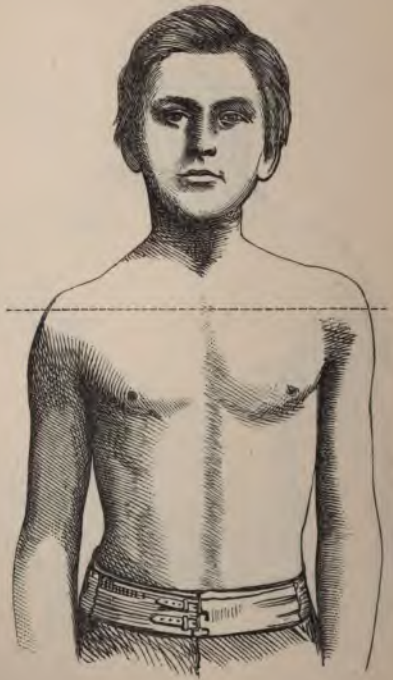


Fig. 6.

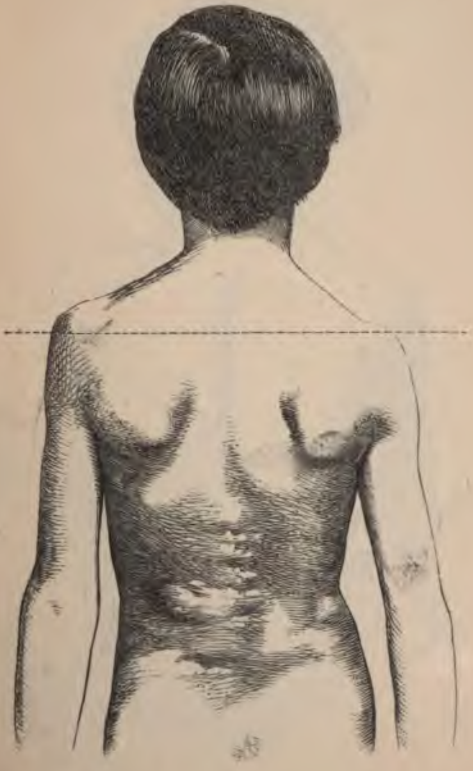


Fig. 7.

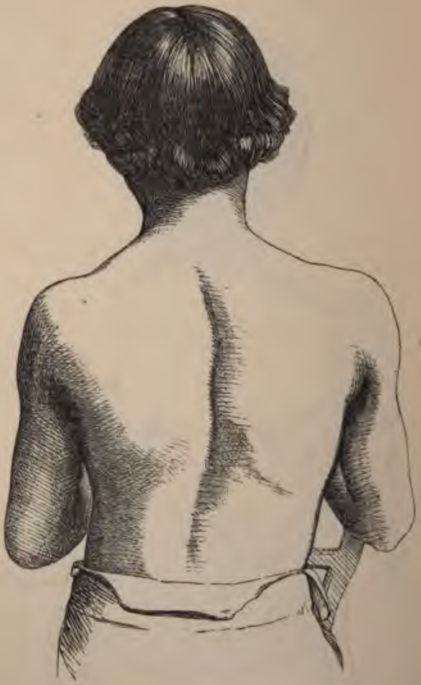


Fig. 8.

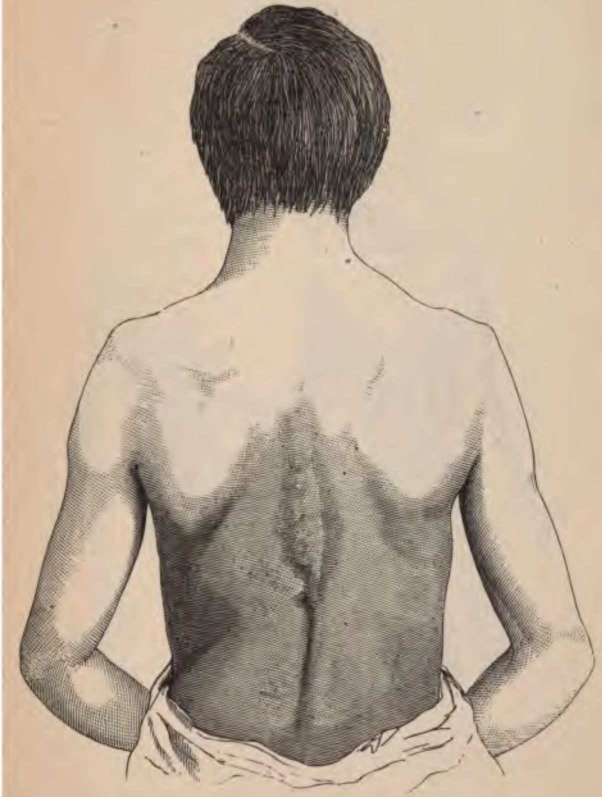


Fig. 11.

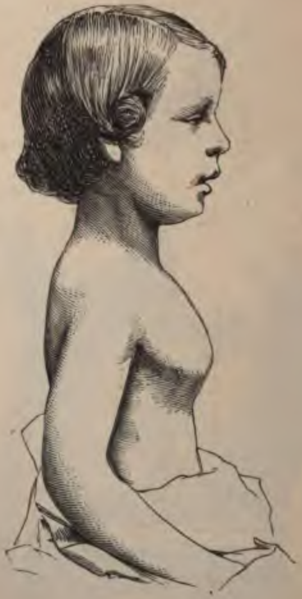


Fig. 12.

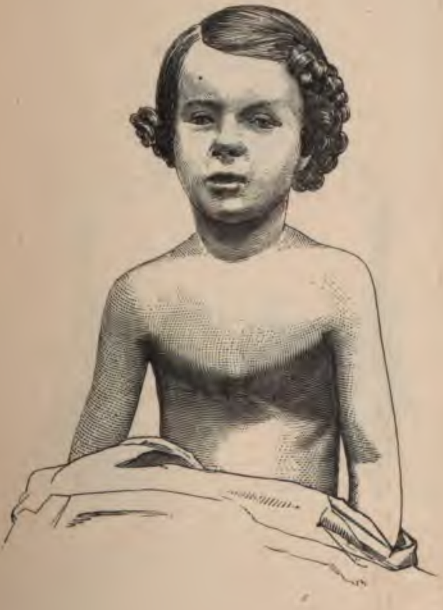


Fig. 13.

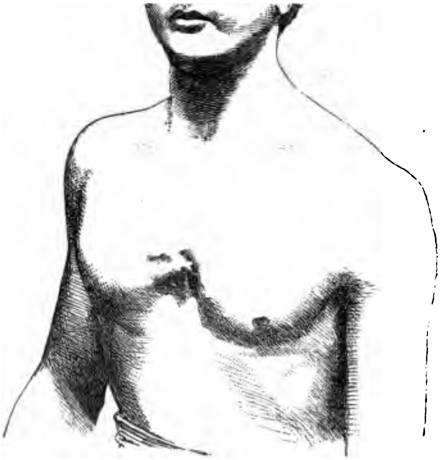
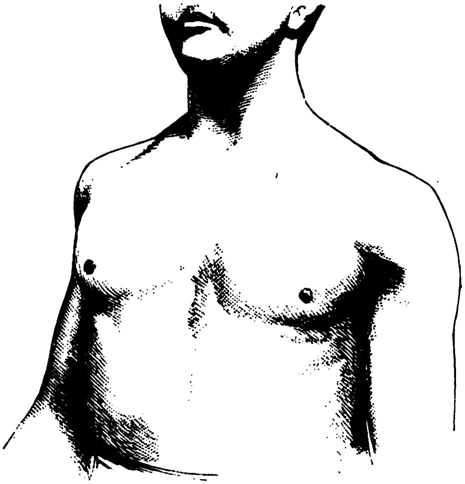


Fig. 14.



APPENDIX B.

TABLE

Showing the state of Growth and Development between the ages of 10 and 18 years, being the *averages* of the actual measurements of 100 boys at each age.

Age.	Height.		Weight.		Girth of Chest.	Fore-arm.	Upper-arm.
Years.	Ft.	In.	Stone.	Lb.	Inches.	Inches.	Inches.
10	4	5½	4	9	25¼	7½	7¾
11	4	7	5	0	26¼	7¾	8
12	4	8¾	5	8¼	27½	8	8¼
13	4	10½	6	0¼	28½	8¼	8½
14	5	0¾	6	9	29½	8½	9
15	5	3	7	5½	30¾	9	9½
16	5	5	8	4½	32½	9½	10¼
17	5	7	9	2½	34¼	10	11
18	5	8	9	11	35¼	10¼	11¼

Abstract of preceding Table, showing average annual rate of Growth and Development from year to year.

	Height.	Weight.	Girth of Chest.	Fore-arm.	Upper-arm.
	In.	Lb.	In.	In.	In.
From 10 years to 11 years.	1½	5	1	¼	¼
,, 11 ,, 12 ,,	2	8¼	1¼	¼	¼
,, 12 ,, 13 ,,	1¾	6	1	¼	¼
,, 13 ,, 14 ,,	2¼	8¾	1	¼	½
,, 14 ,, 15 ,,	2¼	10½	1¼	½	½
,, 15 ,, 16 ,,	2	13	1¾	½	¾
,, 16 ,, 17 ,,	2	12	1¾	½	¾
,, 17 ,, 18 ,,	1	8½	1	¼	¼

APPENDIX C.

TABLE

Showing the state of Growth and Development of men on arriving at the University; the averages being those of the first 100 names on the book of the Oxford Gymnasium, all at or under 19 years of age.

Height	5 ft. 8¼ in.	(68·257 in.)
Weight	9 st. 7 lb.	(132·970 lb.)
Chest	33 in.	(32·953 in.)
Fore-arm	10 in.	(9·792 in.)
Upper-arm	10¾ in.	(10·702 in.)

The greatest developments being:—

Height	6 ft. 6 in.[a]
Weight	12 st. 2 lb.
Chest	39 in.
Fore-arm	11¾ in.
Upper-arm	12¾ in.

The smallest developments being:—

Height	5 ft. 2 in.
Weight	7 st.
Chest	27¼ in.
Fore-arm	8½ in.
Upper-arm	8¾ in.

[a] The chest in this case was only 36 inches—age, 18.

APPENDIX D.

TABLE showing the effects of Systematized Exercise upon men of different degrees of Physical Power.

Case	DATE.	MEASUREMENTS, &c. Age.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.	INCREASE. Height.	Weight.	Chest.	Fore-arm.	Upper-arm.	REMARKS.
		Yrs.	Ft. In.	St. Lb.	In.	In.	In.	In.	Lb.	In.	In.	In.	
11.	1859 Oct.	20	5 5⅛	7 1	29	8	8¼						
	,, Dec.	,,	,,	7 4	31	8⅜	9	,,	3	2	⅜	¾	Imperfectly developed, but not constitutionally delicate. The attendance during the last Term very irregular.
	1860 Jan.	,,	,,	7 8½	31½	,,	9½	,,	4½	½	,,	½	
	,, June.	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	
					Total increase		.	,,	7½	2½	⅜	1¼	
12.	1859 Oct.	19	5 2⅜	8 0	30½	9	9½						Shapely and well-proportioned. A remarkable feature in this case is the renewal and steady continuation of the upward growth, which had been prematurely arrested.
	,, Dec.	,,	5 3¼	8 1	33	9½	10¼	⅝		2	½	¾	
	1860 Jan.	20	5 3⅜	,,	,,	,,	,,	⅜	,,	,,		,,	
	,, ,,	,,	5 4⅛	,,	33½	9¼	,,	½		½	Lost ¼	,,	
	,, June.	,,	5 4⅜	8 3	34	,,	,,	½	2	½	,,	,,	
	,, ,,	,,	,,	8 5	34¼	9½	10½	,,	2	¼	¼	¼	
					Total increase			2	5	3		1	

B.	*1862 Sept.*	*11*	*4*	*7*	*5*	*11*	*27*	*8¼*	*8¾*						Height *average*; other measurements above average. Growth and development at first slow, but regular; afterwards rapid and culminating.
	1863 Sept.	12	4	8¼	6	1	29	8¾	9½	1¼	4	2	¼	¾	
	1864 June.	13	4	10¾	6	9	30¾	9	10	2½	8	1¾	¼	½	
	1865 May.	14	5	1¾	7	12	33½	9⅝	10¾	3	17	2¾	⅝	¾	
	1866 May.	15	5	4¼	9	0	34½	10⅛	11⅛	2½	16	1	½	⅜	
							Total increase .			9¼	45	7½	1⅝	2⅜	
F.	1861 Dec.	10	4	2½	4	7	25½	7½	7¾						Height *below* average; other measurements slightly below average. Growth and development at first slow and irregular; afterwards rapid, regular, and culminating.
	1862 July.	10	4	3⅛	4	8	26½	8	8⅛	⅝	1	1	½	⅜	
	1863 Mar.	11	4	5⅛	5	1	27	8	8⅛	2	7	½	,,	,,	
	1864 July.	12	4	7½	5	8	28¾	8⅝	8⅝	2⅜	7	1¾	⅝	½	
	1865 July.	13	4	10¼	6	7	30½	9⅛	9¾	2¾	13	1¾	½	1⅛	
	1866 Dec.	15	5	3⅜	8	6	34½	10⅛	10⅞	4⅝	27	4	1	1⅛	
							Total increase .			12⅞	55	9	2⅝	3⅛	
S.	1860 Jan.	12	4	1⅞	3	13	23½	6½	6						Height and all other measurements *greatly* below average; the whole frame stunted and dwarfish. Advancement at first slight and very irregular; afterwards rapid and comparatively regular.
	,, July.	12	4	3¾	4	0	24	7	6¾	1⅞	1	½	½	¾	
	,, Dec.	13	4	4½	4	1	24½	7	7	¾	1	½	,,	¼	
	1861 Dec.	14	4	4½	4	7	25	7¼	7¼	,,	6	½	¼	¼	
	1862 July.	14	4	5⅜	4	8	26	7½	7½	⅞	1	1	¼	¼	
	1863 Mar.	15	4	7¼	4	12	26½	7⅝	7⅝	1⅞	4	½	⅛	⅛	
	1864 July.	16	4	11¼	6	6	29½	8⅝	8¾	4	22	3	1	1⅛	
							Total increase .			9⅜	35	6	2⅛	2¾	
A.	1859 Dec.	14	4	5	6	1	26½	8	7¾						Height *greatly* below average; other measurements also considerably *below* average. Instant and extreme acceleration of growth with moderate increase in development; afterwards growth slightly above average, with great but irregular increase in other measurements.
	1860 Sept.	14	5	2	6	4	29	9	9½	11	3	2½	1	1¾	
	1861 July.	15	5	4½	7	7	30	9	9½	2½	17	1	,,	,,	
	1862 Sept.	16	5	7¼	8	12	34½	10	11¼	2¾	19	4½	1	1¾	
							Total increase .			16¼	39	8	2	3½	

APPENDIX D.

TABLE showing the effects of Systematized Exercise upon men of different degrees of Physical Power.

Case.	DATE.	MEASUREMENTS, &c.						INCREASE.					REMARKS.
		Age.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.	
		Yrs.	Ft. In.	St. Lb.	In.	In.	In.	In.	Lb.	In.	In.	In.	
H.	1859 Oct.	20	5 5⅛	7 1	29	8	8¼						Imperfectly developed, but not constitutionally delicate. The attendance during the last Term very irregular.
	,, Dec.	,,	,,	7 4	31	8⅜	9	,,	3	2	⅜	¾	
	1860 Jan.	,,	,,	7 8½	31½	,,	9½	,,	4½	½	,,	½	
	,, June.	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	
					Total increase .			,,	7½	2½	⅜	1¼	
R.	1859 Oct.	19	5 2⅝	8 0	30½	9	9½						Shapely and well-proportioned. A remarkable feature in this case is the renewal and steady continuation of the upward growth, which had been prematurely arrested.
	,, Dec.	,,	5 3¼	8 1	33	9½	10¼	⅝	1	2½	½	¾	
	1860 Jan.	20	5 3⅝	,,	,,	,,	,,	⅜	,,	,,	,,	,,	
	,, ,,	,,	5 4⅛	,,	33½	9¼	,,	½	,,	½	Lost ¼	,,	
	,, June.	,,	5 4⅝	8 3	34	,,	,,	½	2	½	,,	,,	
	,, ,,	,,	,,	8 5	34¼	9½	10½	,,	2	¼	¼	¼	
					Total increase .			2	5	3¾	½	1	

ABLE of Measurements of Second Detachment of Non-Commissioned Officers selected to be qualified as Military Gymnastic Instructors.

TE.	No.	MEASUREMENTS, &c.								INCREASE.			
		Age.	Height.		Weight.		Chest.	Fore-arm.	Upper-arm.	Weight.	Chest.	Fore-arm.	Upper-arm.
		Yrs.	Ft.	In.	St.	Lb.	In.	In.	In.	Lb.	In.	In.	In.
1862, to July 12th, 1863.	1	22	5	10⅜	9	13	34	10	10¾				
					10	6	38¼	11¼	12¾	7	4¼	1¼	2
	2	23	5	9⅜	12	0	36	10¾	12½				
					11	11	39½	12	14	Less 3	3½	1¼	1½
	3	24	5	10⅜	11	2¼	36⅜	10⅜	12				
					11	4	39½	11½	13½	1¾	3⅛	1⅛	1½
	4	25	5	9½	10	6	36½	11¼	12¼				
					10	4	38½	11½	12¾	Less 2	2	¼	½
	5	25	5	9⅝	9	12	34¼	10	11⅜				
					10	1	37⅜	10¾	12⅝	3	3⅛	¾	1¼
	6	25	5	9¼	11	2¾	38	10¾	12				
					11	4	40½	11⅝	13	1¼	2½	⅞	1
	7	25	5	11⅜	12	4	36½	11¼	12½				
					11	9	39	12	13½	Less 9	2½	¾	1
	8	25	5	9½	11	13	38	11¼	13				
					12	5	41½	11¾	14	6	3½	½	1
	9	25	5	8½	11	0	35	10¾	12¾				
					10	11	38½	11⅜	13½	Less 3	3½	⅝	¾
	10	28	5	10¼	12	3	38¼	10⅞	12				
					12	7	40½	12	14	4	2¼	1⅛	2

	Weight.	Chest.	Fore-arm.	Upper-arm.
	lbs.	In.	In.	In.
The smallest gain . .	0	2	¼	½
The largest gain . .	7	4¼	1¼	2
The average gain . .	2⅛	3	⅞	1¼

APPENDIX F.

RETURN of Course of Gymnastic Training at the Royal Military Academy, Woolwich, from Feb. 10th, 1863, to June 22nd, 1863.

	MEASUREMENTS, &c.								INCREASE.				
No.	Age.	Height.		Weight.		Chest.	Fore-arm.	Upper-arm.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.
	Yrs.	Ft.	In.	St.	Lb.	In.	In.	In.	In.	Lb.	In.	In.	In.
1	18	5	$1\frac{2}{8}$	7	8	$29\frac{4}{8}$	$9\frac{4}{8}$	$8\frac{6}{8}$					
		5	$2\frac{2}{8}$	7	8	30	$9\frac{4}{8}$	$9\frac{4}{8}$	1	,,	$\frac{4}{8}$	,,	$\frac{6}{8}$
2	19	5	$8\frac{4}{8}$	9	$5\frac{1}{2}$	28	11	$10\frac{2}{8}$					
		5	$8\frac{6}{8}$	9	11	$31\frac{4}{8}$	11	$11\frac{3}{8}$	$\frac{2}{8}$	$5\frac{1}{2}$	$3\frac{4}{8}$	,,	$1\frac{1}{8}$
3	17	5	$5\frac{6}{8}$	9	1	$26\frac{4}{8}$		$8\frac{4}{8}$					
		5	$6\frac{1}{8}$	9	1	$29\frac{4}{8}$	$10\frac{3}{8}$	10	$\frac{3}{8}$	,,	3	,,	$1\frac{4}{8}$
4	18	5	$8\frac{2}{8}$	10	0	33	$10\frac{2}{8}$	$10\frac{2}{8}$					
		5	$8\frac{4}{8}$	10	3	35	$10\frac{6}{8}$	$11\frac{4}{8}$	$\frac{2}{8}$	3	2	,,	$1\frac{2}{8}$
5	18	6	$0\frac{4}{8}$	10	13	32	$10\frac{4}{8}$	$9\frac{2}{8}$					
		6	$1\frac{2}{8}$	11	2	34	$10\frac{4}{8}$	$10\frac{7}{8}$	$\frac{6}{8}$	3	2	,,	$1\frac{5}{8}$
6	17	5	$3\frac{4}{8}$	8	1	31	$10\frac{1}{8}$	$9\frac{7}{8}$					
		5	$4\frac{4}{8}$	8	7	33	$10\frac{1}{8}$	11	1	6	2	,,	$1\frac{1}{8}$
7	18	5	$5\frac{2}{8}$	7	13	26	$9\frac{2}{8}$	$7\frac{7}{8}$					
		5	$5\frac{6}{8}$	8	2	29	$9\frac{4}{8}$	$9\frac{4}{8}$	$\frac{4}{8}$	3	3	$\frac{2}{8}$	$1\frac{5}{8}$
8	16	5	$6\frac{6}{8}$	8	3	$28\frac{4}{8}$	9	$8\frac{4}{8}$					
		5	$7\frac{2}{8}$	8	4	31	$9\frac{1}{8}$	$9\frac{4}{8}$	$\frac{4}{8}$	1	$2\frac{4}{8}$	$\frac{1}{8}$	1
9	17	5	$8\frac{3}{8}$	11	3	31	$11\frac{2}{8}$	$10\frac{2}{8}$					
		5	$9\frac{1}{8}$	11	3	33	$11\frac{2}{8}$	$11\frac{1}{8}$	$\frac{6}{8}$	,,	2	,	$\frac{7}{8}$
10	18	5	$11\frac{5}{8}$	11	8	30	$10\frac{2}{8}$	$10\frac{4}{8}$					
		5	$11\frac{6}{8}$	11	8	33	$10\frac{6}{8}$	11	,,	,,	3	$\frac{4}{8}$	$\frac{4}{8}$
11	19	5	$7\frac{6}{8}$	10	2	33	$10\frac{4}{8}$	$10\frac{2}{8}$					
		5	$8\frac{5}{8}$	10	2	$34\frac{4}{8}$	$10\frac{4}{8}$	$10\frac{7}{8}$	$\frac{7}{8}$	,,	$1\frac{4}{8}$	,,	$\frac{5}{8}$
12	18	5	$10\frac{4}{8}$	10	11	32	$10\frac{4}{8}$	10					
		5	$11\frac{7}{8}$	10	11	$33\frac{4}{8}$	$10\frac{4}{8}$	11	$1\frac{3}{8}$	,,	$1\frac{4}{8}$	,,	1
13	19	5	$7\frac{7}{8}$	11	13	33	$11\frac{4}{8}$	12					
		5	$9\frac{5}{8}$	11	13	$35\frac{4}{8}$	$11\frac{4}{8}$	$12\frac{4}{8}$	$1\frac{6}{8}$	,,	$2\frac{4}{8}$	,,	$\frac{4}{8}$
14	17	5	$6\frac{6}{8}$	9	13	29	$10\frac{5}{8}$	$8\frac{2}{8}$					
		5	$7\frac{5}{8}$	10	3	32	$10\frac{5}{8}$	$9\frac{4}{8}$	$\frac{7}{8}$	4	3	,,	$1\frac{2}{8}$
15	19	5	$10\frac{4}{8}$	10	1	$27\frac{4}{8}$	$10\frac{5}{8}$	$9\frac{3}{8}$					
		5	$11\frac{7}{8}$	10	9	$32\frac{6}{8}$	$10\frac{5}{8}$	$10\frac{7}{8}$	$1\frac{3}{8}$	8	$5\frac{2}{8}$	,,	$1\frac{4}{8}$

	MEASUREMENTS, &c.								INCREASE.				
No.	Age.	Height.		Weight		Chest.	Fore-arm.	Upper-arm.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.
	Yrs.	Ft.	In.	St.	Lb.	In.	In.	In.	In.	Lb.	In.	In.	In.
16	18	5	$3\frac{2}{8}$	8	13	29	$10\frac{1}{8}$	$10\frac{4}{8}$					
		5	$3\frac{4}{8}$	8	13	32	$10\frac{1}{8}$	$10\frac{7}{8}$	$\frac{2}{8}$	,,	3	,,	$\frac{3}{8}$
17	18	5	$8\frac{6}{8}$	11	8	33	$11\frac{1}{8}$	$12\frac{7}{8}$					
		5	$9\frac{5}{8}$	11	8	$34\frac{4}{8}$	$11\frac{1}{8}$	$12\frac{7}{8}$	$\frac{7}{8}$	,,	$1\frac{4}{8}$	,,	,,
18	17	5	$6\frac{1}{8}$	9	8	27		$8\frac{6}{8}$					
		5	$7\frac{1}{8}$	9	8	$30\frac{4}{8}$	$10\frac{3}{8}$	10	1	,,	$3\frac{4}{8}$	,,	$1\frac{2}{8}$
19	16	5	$6\frac{4}{8}$	8	10	$27\frac{6}{8}$	$9\frac{5}{8}$	$7\frac{4}{8}$					
		5	$6\frac{7}{8}$	9	1	$30\frac{4}{8}$	$9\frac{7}{8}$	$9\frac{4}{8}$	$\frac{3}{8}$	5	$2\frac{6}{8}$	$\frac{2}{8}$	2
20	18	5	7	9	1	$28\frac{2}{8}$	10	$9\frac{4}{8}$					
		5	$7\frac{5}{8}$	9	1	31	10	$10\frac{4}{8}$	$\frac{5}{8}$	,,	$2\frac{6}{8}$	,,	1
21	18	6	$1\frac{1}{8}$	11	12	$34\frac{6}{8}$		$11\frac{7}{8}$					
		6	2	11	12	$35\frac{7}{8}$	11	$12\frac{1}{8}$	$\frac{7}{8}$	,,	$1\frac{1}{8}$	,,	$\frac{2}{8}$

In this class it will be seen that the youngest was 16, the eldest 19; the average age being $17\frac{3}{4}$. In a course extending over four months, the increase was—

	Weight.	Chest.	Fore-arm.	Upper-arm.
	Lb.	In.	In.	In
The smallest gain . .	1	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{4}$
The largest gain . .	8	$5\frac{1}{4}$	$\frac{1}{2}$	$1\frac{5}{8}$
The average gain . .	$1\frac{3}{4}$	$2\frac{1}{2}$	$\frac{1}{16}$	1

APPENDIX G.

Result of one Year's continuous Practice.

The following Table shows in another form the results of the System; not by brief courses or periods of voluntary attendance, but by a year's steady practice from birthday to birthday, with two articled pupils, the younger being 16, the elder 20.

Case.	DATE.	MEASUREMENTS, &c.								INCREASE.				
		Age.	Height.		Weight.		Chest.	Fore-arm.	Upper-arm.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.
		Years.	Ft.	In.	St.	Lb.	Inches.	Inches.	Inches.	Inches.	Lb.	Inches.	In.	Inches.
A.	1861 Oct. 17.	16	5	2¾	7	10	31	8	9¼					
	1862 Apr. 17.	,,	5	4	8	12	34½	10	11¼	1¼	16	3½	2	2
	,, Oct. 17.	17	5	4¾	9	3	36	10	11¼	¾	5	1½	,,	,,
					Subsequent Measurement.									
	1863 Mar. 23.	18	5	6⅜	10	10	37½	11¼	13	1⅝	21	1½	1¼	1¾
B.	1862 Feb. 24.	20	5	8½	10	13	34	11¼	11¾					
	,, Aug. 24.	,,	5	8⅞	11	4	38½	12	12¾	⅜	5	4½	¾	1
	1862 Feb. 24.	21	,,		11	7½	40	12½	13¼	,,	3½	1½	½	½

Thus in the year's work the increase was—

	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.
	Inches.	Lb.	Inches.	Inches.	Inches.
With the younger . .	2	21	5	2	2
With the elder . . .	⅜	8½	6	1¼	1½

APPENDIX H.

A SYSTEM OF MEASUREMENTS

TO DETERMINE THE RATE OF GROWTH AND DEVELOPMENT.

Height (*without boots*). The position of *Attention*. The heels together, the knees braced back, the chin raised, the head held steady, the shoulders square to the front; the heels, hips, shoulders, and head touching the pillar of the standard. The height to the eighth of an inch to be reckoned.

N.B. This measurement, when repeated, should always be taken at the same time of the day, and after the same amount of bodily exertion.

Weight (*in working costume*, i. e. *in light shoes, flannel trowsers, flannel shirt or jersey*). The weight to a quarter of a pound to be reckoned.

N.B. This measurement, like the preceding, when repeated, should always be taken at the same time of day, and with reference to any circumstance which would affect its accuracy.

Chest (*over the jersey or naked breast*). The position of *Attention*, but with the arms horizontally extended, the palms of the hands held upwards and open, the fingers straight. The tape should be passed around the chest in the line of the nipple. The girth to the quarter of an inch to be reckoned.

> N.B. Care must be taken that the chest is not inflated beyond its usual expansion during ordinary breathing. Where a single measurement is taken, the above line is the best, as gauging approximately at once the muscular and respiratory capacity; but when the latter quality is of primary importance (as in rowing), a second measurement should be taken lower down the chest, the tape being passed over the ninth rib. A third measurement, to test the elasticity and mobility of the chest, as shown by the extent of its expansion on the fullest inspiration beyond the point of the preceding measurements, may be taken on either of the above lines. To take these measurements with perfect accuracy is always difficult, as the mere act of attention and state of consciousness or expectation of the person being measured will affect the breathing and therefore the actual girth of chest at the time. For this reason it is always desirable whenever it can be done, or when any doubt as to the accuracy of the measurements exists, to draw the attention by question or remark to some other subject than that of the work on hand.

Fore-Arm. (*All measurements of the upper and lower limbs to be skin measurements.*) The arm extended as in the preceding measurement, but with the hand tightly closed. The tape to be passed around the thickest part of the arm, and its girth at that point reckoned.

> N.B. With men who have taken little exercise this line will always be found near the elbow joint, but as the limb becomes developed, and the numerous muscles of the fore-arm acquire bulk and power from exercise, the greatest girth will be found from two to three inches below it: unless this circumstance be kept in view the actual increase will not be perceived.

Upper-Arm. The hand closed as in preceding measurement, but with the arm bent at the elbow, and the hand brought down towards the shoulder; this should be slowly and gradually done, bending the joints of the fingers, clenching the fist, and bringing the fore-arm down upon the upper-arm. The tape to be passed in a straight line around the thickest part of the arm; this will always be found over the ridge of the very prominent muscle on the upper surface (the biceps). It is by the contractions of this muscle chiefly that the arm is bent in the position of the measurement, and, with its antagonistic muscle on the obverse side of the arm (the triceps), by which it is again extended, forms the bulk of the upper arm. The tape measurement, therefore, at this point, *cæteris paribus*, is an accurate gauge of its power.

N.B. When the whole arm is fully developed, the difference in size between the fore and upper-arm in an adult of medium stature will be about two inches, and it will almost invariably be found that when the upper-arm is feeble, the upper region of the chest will be feeble also. With a chest of forty inches the arm would probably be twelve inches and fourteen inches.

Certain measurements of the lower limbs should also be taken and recorded when it is desired to ascertain their present condition or rate of development; the measurements which will show these most accurately, and at the same time most directly correspond with those of the upper limbs, are the following :—

Calf. The limb to be held stiff and straight, the heel raised from the ground, the toes pressed strongly down and the knee braced back. The tape to be passed around the thickest part of the calf, and as the position of this line will somewhat vary with different men, and with the same limb in different stages of development, one or two points should be tried, and that which shows the greatest girth selected.

Thigh. The limb placed as in preceding measurement. The tape to be passed in a horizontal line around the thickest part of the limb, which will be at the highest point of the thigh admitting of horizontal measurement.

* * *

APPENDIX I.

GYMNASTIC SCHOOLS.

THEIR CONSTRUCTION AND REQUIREMENTS.

WITH the first conception of the leading features of this system, I perceived that the construction and fitting up of proper gymnasia would be a *sine quâ non*, indeed must be viewed as an integral part of the system itself.

In the cultivation of the bodily powers it is quite necessary that the instruction should be progressive,—that to-day's lesson should, as it were, be taken up to-morrow and carried a little farther, and the next day and the next a little farther still, and so on to the end of the course. When thus administered, each lesson is in accord with that which preceded it, and with that which is to follow it—each aiding each—each improving that which has gone before—each preparing the way for that which is to come; but this, of course, can only be done where provision is made for regular and consecutive instruction. Now, regularity and consecutiveness, it will at once be seen, are quite incompatible with open-air practice in any country whatever; and in a climate like ours are simply impossible. There are few days in the year that are really fit or suitable for such practice, or on which men would willingly encounter its discomforts; and a system of bodily training which is dependent upon the favour of the weather is in reality no system at all.

I have alluded to the discomforts of open-air practice; these may seem trifling, but when examined are more serious than appears at first sight. To execute any gymnastic exercise, or any exercise indeed of any kind in which strength is to be exerted, or is to be derived from its performance, there must be complete freedom of clothing. This simply means that a man must be stripped to his shirt and trowsers, with his neck open, his head bare, and his sleeves tucked up to his elbows. Now, it is of the essence of gymnastic exercises, after the rudimentary lessons, that the efforts shall for the most part be brief and energetic, with some necessary standing about, waiting for and watching the efforts of others. And this, with men so employed, and so exposed, and so constituted, is, save on rare occasions, neither sanitary nor even safe in the open air.

I need scarcely, I am sure, state, that I of all men am least disposed to enervate or *coddle;* the whole work of my life has been, and is, and probably will be, to make men not only healthier but hardier; to teach them how to retain the strength they have, as well as how to add to its amount. But if experience has taught me anything, it has taught me this; that more evil may be done by rash and sudden exposure—by what is generally known as the *hardening* system, than by all the coddling in the world. It is not by exposure that men are either strengthened or rendered hardy; they must be strong and hardy before they are fit to be exposed; they must be seasoned first, and exposed afterwards. If we cannot season a piece of timber by sudden, or extreme, or unregulated exposure, we must not think we n do so with a living man, or a living anything.

nother important reason why proper gymnasia are tial is, that they may be fitted up with apparatus of a character and description which could not be attempted out of doors. In elaborating this system of bodily training, I have found it necessary to invent many new machines to yield the special form of exercise which I desired in order to produce certain results in the learner; and almost all those which are called of an educational character, and have for exclusive object to cultivate the resources of the body, require the roof and walls for support, and the soft floor of the building for safety; and those of an entirely opposite description can be erected, and the exercises practised on them, with much greater facility here than in the open air; for every portion of the interior face of the walls, and every part of the internal roof, may be utilised, turned to immediate account, and made to serve as bona fide apparatus.

I say nothing of the facilities which a building presents over the open ground for giving and receiving instruction, and of preserving order and propriety among the learners, without having recourse to too strict a discipline. For it is quite essential to safety, as well as to advancement, that the strictest order and propriety should be preserved in the gymnasium; and there is no fact more undoubted than this, that amongst gymnastic apparatus, the disposition of the learner to be inattentive and careless, and the difficulty of the instructor in communicating instruction and maintaining order, is uniformly beyond comparison greater in the open air than in the gymnastic school. Neither do I notice the safety arising from the assured condition of the apparatus in the gymnasium, exposed as it is to no atmospheric influence, always dry and always clean. Indeed, while the out-of-door apparatus must necessarily be getting worse and worse, the indoor apparatus, if properly constructed, and its materials suitably selected, should be virtually indestructible.

I have thus noted a few, and only a few, of the advantages which the gymnasium possesses over the gymnastic ground, but each one of these is most important in itself, and is pregnant with many others. I would now enquire, are there any advantages on the opposite side, any advantages which the ground has over the building? And, if so, are they of such importance as in any way to counterbalance those which I have just enumerated in favour of the building? These are questions which I have fully considered, and I am prepared to answer, 'None—not one;' the open-air practice has not one real advantage; it has not even any apparent one which may not be shown to have a reverse influence and bearing.

Its apparent advantages are—1st, ample space; 2nd, abundance of light; 3rd, pure air. With the phrase 'out-of-doors' and 'open air,' we are led to associate ample space, but this signification is often quite illusory when applied to the present subject; for it is found that the very places where gymnastic exercises are most wanted, where they would prove the greatest boon, are precisely those where ground is scarcely attainable at any price or for any purpose, namely, in towns and in barracks situated in closely-populated districts. In such cases the advantage, of course, is all in favour of the building,—in favour of the method which knows how to economise every square foot of ground, and to make it serviceable all day and every day, morning, noon, and night, wet or dry.

A small nook in a play-ground or in a barrack-yard, 80 ft. by 40 ft., will be sufficient for a gymnasium, which will give ndant accommodation throughout the year to the largest l or college, or to a garrison of a thousand men. They no more ground than the apparatus covers; and they could use no more were it planted in the middle of the widest common in England.

The question of light, when examined, is solved at once; and I have no hesitation in saying that it is in favour of the building; abundant light for any purpose can be admitted into any building, and in the gymnasium it can be so admitted and so distributed as to meet precisely the special wants of the special exercises.

The question of pure air is less easily disposed of, for there is nothing more essential to health and to health-giving exercise than pure air; while there is, on the other hand, nothing more liable to deterioration, for every breath we breathe acts injuriously upon it,—subtracts from it some portion of the good which it possesses, and imparts to it that which is pernicious; and it must be admitted that this process of deterioration is only sustained where the air is confined around the breather in a building, and is entirely avoided when he stands in the great air ocean out of doors.

Moreover, it must never be forgotten that a gymnasium is a veritable temple to health in the highest sense of the word; and pure air, which is desirable everywhere, is imperatively necessary here, absolutely essential during exercise, not only for the perfect aëration of the blood, but as the natural stimulant to physical exertion.

And again, just in the same ratio with the requirement for the purity of the air in a gymnasium, is its liability to deterioration; first, by the doubly-increased respiration of the inmates—each breath being larger in volume, and each following each in quicker succession during exercise than when the body is wholly or comparatively at rest; and secondly, in a great degree also, by the exudations from the skin, which is stimulated to its utmost activity by the powerful and sustained muscular exertion; and it must be remembered also, that while these exudations are increased to their utmost extent by the energy and freedom of the partly denuded body, its escape into the surrounding atmosphere is also by the same means facilitated. Now while these are all incalculable advantages to the individual, and the very source and secret of the health and strength which he derives from exercise, they all tend directly and powerfully to deteriorate the air.

Another point still; admitting that the gymnasium is occupied to the estimated extent of its working capacity, at the end of an hour (the usual time allotted to an ordinary lesson) the air in the building, were there not an unceasing interchange taking place between it and the external air, would be so deteriorated as to be rendered less suitable to the use, and less pleasant to the sense, of the next class of learners.

Here, then, we encounter these important facts, not only that pure air is essential to health, and to the pleasurable sustentation of active bodily exertion; but that this exertion itself is a powerful agent in its deterioration, and that this deterioration is only felt where the same air has to be inspired and re-inspired, as in a building.

Now as this necessarily applies to all buildings, though not to all in an equal degree, we may be sure there is a way in which this evil can be avoided, for He who planned our existence did so with the full comprehension of our wants,—saw that while we were so constituted as to require the lter and protection of dwellings in which to live and and toil, that these very buildings expose to de- ion the substance on which we depend for momentary . The difficulty that seemed insurmountable is at once overcome by the action of the law regulating the constitution of the air itself. On the slightest change in the constituents of the air, such as that caused by respiration, or by the elevation of its temperature, it is impelled to instant motion; forced to shift and change its place, that place being immediately occupied by the surrounding air; so that motion and change of position is induced, proportionate in force and in extent to the primary displacement. This law is in unceasing and unerring operation over the whole surface of the globe, regulating equally the mighty currents caused by the sun's heat in the belt of the tropics, and the slight undulations in an ordinary room caused by the breath of a solitary inmate. This law is the key to all our rational systems of ventilation. It teaches us to construct our dwellings in such a manner that the air, which is in unceasing motion,—a mighty current ever flowing, though changing its direction with proverbial inconstancy,—may pass through them in its course, cleansing them of every impurity. It teaches us so to regulate the admission of this current, that at any time, and at any season, it shall be in accordance with the wants and the wishes of the inmates.

The special mode of ventilation for a gymnasium I conceive to be,—the building must be so constructed that the whole body of air within it may in a few minutes be changed for an equal body of fresh air, for this will be required at frequent intervals. It must be so constructed that the deteriorated air may ascend and pass at once out of the building, and a fresh supply at the same time enter; and these apertures for ingress and egress must be so placed, that the fresh air may be admitted at such distance from the inmates that it shall not strike them in compact cold currents, or draughts as they are called, but be uniformly diffused; for this must be maintained throughout the working day. It must be so constructed, in fine, that it may be as snug as an ordinary room in winter, and as free and airy as the open heath in summer. And this should be done by what may be called natural means.

Thus much for the purity of the air; but air has other qualities besides purity, for we live in it as well as breathe it; it comes in contact with our skin as well as with our lungs; temperature, therefore, is very important. The air may be quite pure when the thermometer stands at 20 degrees below freezing-point, as we sometimes experience, or rises to 80 in the shade, but neither of these conditions are favourable to exercise, and least of all to gymnastic exercise.

Now in a properly-constructed gymnasium, the temperature of the air may be rendered pleasantly cool in summer, and sufficiently warm in winter, to let men freely strip for active exercise. We do not want a heated or rarefied air to breathe during active exercise; men have the materials of heat within themselves, and want but exercise to ignite the fuel and sustain the fire; but we do want the temperature of the air so raised as to remove actual discomfort in stripping to work, and to dry and keep dry the apparatus, which must come in constant contact with the naked hand, and this can only be done in the properly-organized gymnasium[a].

I will now notice a few of the principles which guided me in preparing a design for a building suitable to the system.

The first of these was, that the form and manner of con-

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this purpose there is nothing so good as the open fire-
tributed in suitable places in the different divisions of the

struction of the gymnasium should be such as to admit of the erection of the desired system of apparatus, and to present the greatest facilities for instruction and supervision. The second, that it should be constructed to meet, in the best manner, the sanitary requirements which I have just noticed. The third, that in all important respects, the same design should be capable of reduction or extension, so that its working capacity might be in proportion to local requirements. In this last respect it was not necessary to compute the absolute working space required for every class of learners, but to ascertain the smallest dimensions of a building which would contain with adequate freedom a fair selection of the essential apparatus in the different sections of the system, and from this minimum size to ascend by carefully regulated gradations to a maximum size.

The whole exercises of the system resolve themselves into two distinct kinds; first, those with moveable apparatus, used for the introductory course, in which the learner lifts or wields the article of apparatus, he himself standing firm; and secondly, those on the fixed apparatus, comprising the bulk of the system, where the learner himself moves or turns, the apparatus or machine being fixed or firm.

This distinction is very important, not only as affecting the character of the exercise to be performed, but the whole material means used in performing it, and even necessitates a distinct division of the building itself into two parts, each part being in certain respects, in appearance and in fact, the very antithesis of the other. In the first division, that for the moveable apparatus, the floor is retained perfectly free and firm, the apparatus, when not in use, being ranged in racks along the walls. In the second division, the floor is *made of soft* elastic materials, with every spot of its surface mapped out and studded with apparatus permanently fixed.

I have already stated that, in elaborating this system of bodily training, I have found it necessary to invent many new machines to yield the special form of exercise which I desired, in order to produce certain results in the learner; for instance, I have found that few men are equally developed on both sides of the body, as a natural result of the greater employment given to the right side during the period of growth; and this applies not only to the arm, but to the whole side, from shoulder to hip, and not infrequently including also the lower limb, when the development of the right leg and foot preponderates over the left. Now I consider it of the greatest importance to health that this lost balance of power should be restored, this equilibrium of development re-adjusted; and to accomplish this I have found it necessary to invent a number of machines for the sake of the form of exercise which I desired to be performed on them. Among the first of these I would mention the Elastic Ladder and Row of Rings; machines designed expressly to give employment to both sides of the body equally, and especially to the chest and upper limbs, by necessitating that both sides of the body shall perform the same work, requiring the exertion of the same degree of effort, and that neither side shall be able to aid the other; each side must do its own share only; and therefore if the weaker side be doing as much as the stronger, it will virtually be doing more (being weaker), and the amount of difference in exer- on will be of course in relation to the amount of difference levelopment or power. And therefore the unerring result e natural law of development being, *cæteris paribus*, in on to activity, the weaker side will ultimately recover its lost position and its fitness for fair companionship with its fellow.

I have mentioned the nature and object of these two machines, for the twofold purpose, first, of showing that it was what I had discovered to be the actual wants of learners or pupils which guided me in preparing my exercises and in inventing apparatus which would yield the form of exercise desired; and second, of showing that it was the form of that apparatus and the nature of the exercises to be performed on them which determined the form and construction of the building itself.

For instance, an important section of apparatus is that which teaches men to clear objects by running, vaulting, and leaping; therefore for these considerable length is required. A second section of an elementary character, as the Horizontal Bar, Parallel Bars, and the two machines which I have just described, machines all capable of being worked by large numbers of men at the same time, also requires length; therefore the oblong shape, which admits of the apparatus of these important sections being arranged side by side, has been chosen for the gymnasium. A third section, consisting of all climbing apparatus, whether mast, rope, or pole, requires height; but as these are all vertically placed, they may be closely grouped, so that a small portion only of the building needs to be very lofty. These three sections of the apparatus in a very clear manner determine the most suitable and serviceable form of building, namely, an oblong, of a breadth about half the required length, and with one portion of it lofty. The position of this lofty portion naturally falls to the centre; for the end walls are also utilised, the one bearing every form of vertical apparatus, the other every form of slanting apparatus. The elevated portion farther serves in lighting and ventilating the gymnasium in the place where light is most wanted, and is where ventilation, of one kind, may be most effectively obtained.

The same oblong form I found also to be the most suitable for the other division of the building; for the distribution of classes in the introductory course of gymnastics, and for classes of fencing and sword exercise. And as it was desirable for purposes of supervision and instruction that both divisions should form one building, and that every portion of it should be overlooked from every other portion, these two divisions are generally placed rectangular to each other.

I have only now to notice the galleries for spectators. It is most desirable to encourage visitors to the gymnasium; it is remarkable, sometimes, how the presence of visitors serves to stimulate the learners to energetic action, and at the same time to assist in preserving the proper decorum of the lesson; but it is equally desirable that they should not mix among, or in any way interfere with, the learners. The galleries for spectators in both divisions are so arranged that they overlook the whole gymnasium without encroaching upon the working space.

APPENDIX K *.

(I am indebted to the Rev. T. H. T. Hopkins, M.A., Magdalen College, Oxford, for this Table.)

TABLE A. Best performances of Competitors (Winners) at Oxford and Cambridge, and the Inter-University Athletic Games; and at the Champion Meetings of the Amateur Athletic Club, *in each year*, from March 1866 to March 1868 inclusive. (For Tables B and C see next page.)

	RUNNING ON THE FLAT.							RUNNING WITH OBSTACLES.
	100 yards.	440 yards.	880 yards.	1 mile.	2 miles.	3 miles.	4 miles.	10 Hurdles, 3 ft. 6 in. high. 120 yards.
	Sec.	Sec.	Min. Sec.	Min. Sec.	Min. Sec.	Min. Sec.	Min. Sec.	Sec.
A. 1866.	10¼ [1]	53½	2 7	4 39	10 20 [1]	—	21 41	16½
„ 1867.	10⅕	51½	2 2⅘	4 36⅗	9 59½	—	22 14½	16½
„ 1868.	10	50⅘	2 3⅘	4 28⅘ [2]	—	15 21	—	16⅗
B.	10 [3]	50⅘	2 2⅘	4 28⅗ [2]	9 59½	15 21	21 41	16⅗
C. Amateurs.	10	50¼	1 59	4 32	10 10 [1]	—	21 17	16¾
Professionals.	9½	48½	1 56½	4 17	9 11	14 56	19 54	—

[1] On grass.

[2] 4 min. 32 sec. was also given as the time of this race.

[3] On running-path, with favourable wind.

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* [Owing to the great impetus given to Athletics in the last few years, the above performances have been in some cases surpassed. But they still remain good instances of high excellence in the various exercises.]

APPENDIX K (*continued*).

TABLE B. Best performances in *any* of the above Athletic Meetings.

TABLE C. Best performances, as given in the Appendix to the 'Athlete' for 1866, being the quickest times, &c. up to that date by Amateurs and Professionals.

NOTE.—Tables A. and B. embrace the performances of the best Amateur Athletes of the present day, where the greatest care was exercised to ensure the accuracy of Times and Distances, a condition which in more local, or less public, sports is often neglected, or at best imperfectly secured.

	JUMPING.			PUTTING.		THROWING.	WALKING.[6]			
	Long.	High.	Pole.	Weight 16 lb.	Hammer 16 lb.	Cricket Ball.	1 mile.	4 miles.	7 miles.	21 miles.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Yd. Ft.	Min. Sec.	Min. Sec.	Min. Sec.	Hr. Mn. Sc.
1866.	20 4	5 9½	10 0	34 10	91 2½	109 2	—	—	59 32	—
A. 1867.	20 2	5 9	9 6	36 6	98 10	113 2	—	—	58 18	—
,, 1868.	21 4	5 8¼	9 6	36 6	99 6	119 5 in.	—	34 10¾	60 25	—
,,	21 4[1]	5 9¼	10 0	36 6[2]	99 6[3]	119 5 in.[5]	—	34 10¾	58 18	—
B. Amat.	21 2	5 9½	—	41 0	94(22lb.)[4]	—	7 29	—	58 12	—
C. Prof.	—	—	—	—	—	—	6 35	28 52	50 54	2 58 26

[1] The run and take-off were from a path laid with ashes, with (probably) a drop of about 1½ in. The same individual jumped 21 ft. 2½ in. on level grass.

[2] Measured from a tape, beyond which the thrower must not step. The weight is put with one hand from the shoulder, with 7 ft. run.

[3] Measured from the foot of the thrower.

[4] Hammer of 11 lb. has been thrown 176 ft.

[5] With favourable wind.

[6] 100 miles is said to have been walked in America in 22 h. 19 m. 10 s., including stoppages.

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